R R Kelly Esq
5-9 Mark Lane E.C. London

THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXV. No. 633.] LONDON, JUNE 29, 1875. [27TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,800 cubic feet of gas per ton of coal; 28-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
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GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
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SPECIAL GASOMETER PAINT
(Mixed ready for use).
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov. 2, 1866.*
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(SUCCESSORS TO SAMUEL CALLEY. ESTABLISHED 20 YEARS.)
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MADE FROM THE BEST QUALITY
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WELL-SEASONED PLANKS.
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COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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THE WEDNESBURY TUBE-WORKS, WEDNESBURY;
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Established at the commencement of Gas Lighting.
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J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
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For the English Government, and for the Government of the Netherlands;
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Presented by Her Majesty's Government to the French Government;
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DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
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G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

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GAS-METERS, GOVERNORS, EXPERIMENTAL GASHOLDERS, &c.

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GAS PURIFICATION & CHEMICAL Co., LIMITED.

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

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THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

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TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

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IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
CORE BARS, COILS, COCKS (IRON OR BRASS),
CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

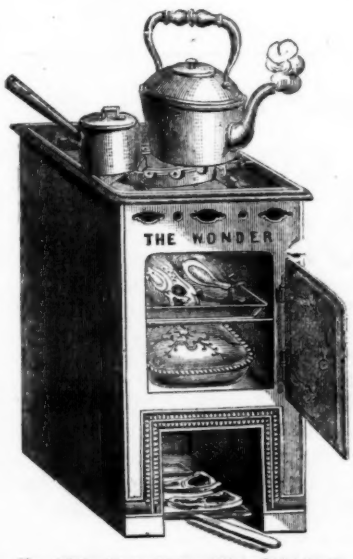
COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

Crystal Palace District Gas Company, Lower Sydenham, S.E.

To Messrs. John Wright and Co., Essex Works, Birmingham.

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, MAGNUS OHREN.



Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,
Has all the appearance of a Bright Fire.
PRICE from 32s.

LIVESEY FIRE-CLAY WORKS.

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS, LIMITED,

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AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

1862.

PATENT ANTIMONY PAINT.

CLASS II.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

This Paint having been in general use over thirteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced or resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

The following Gas Companies in London have used the Paint for years—viz., The Gaslight and Coke, Imperial, Independent, City of London, Commercial, London, and Surrey Consumers.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SPECIAL DRIERS FOR ANTIMONY PAINT SUPPLIED.

HODGE & CO.'S

IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES

TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

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Drawings and Prices upon application.

PRIZE MEDALS—1862, 1867, 1871, 1874.

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SOLE LICENSEES AND AGENTS FOR GREAT BRITAIN FOR

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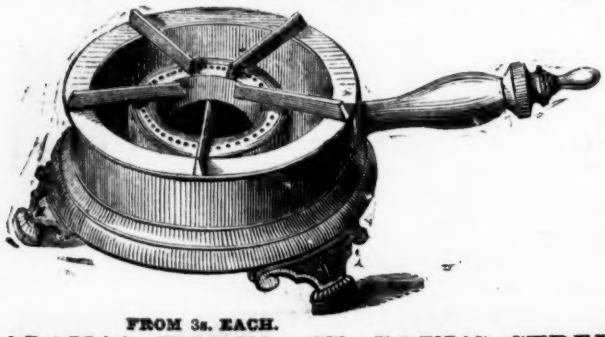

This Instrument is easily fixed under any Burner; it regulates the volume of Gas to be consumed, notwithstanding the Size of the Burner or the Variation of Pressure.

Full particulars on application, also Pamphlets on the

"ADVANTAGES OF COOKING AND HEATING BY GAS."

With Illustrations, &c., of the latest and most improved

GAS KITCHENERS, GRILLERS, COOKING STOVES, REGISTERED BOILING STOVES (See Margin); also the NEW SAFETY PATENT TUBULAR GAS BOILERS.

LIBERAL TERMS TO THE TRADE.

FROM 3s. EACH.

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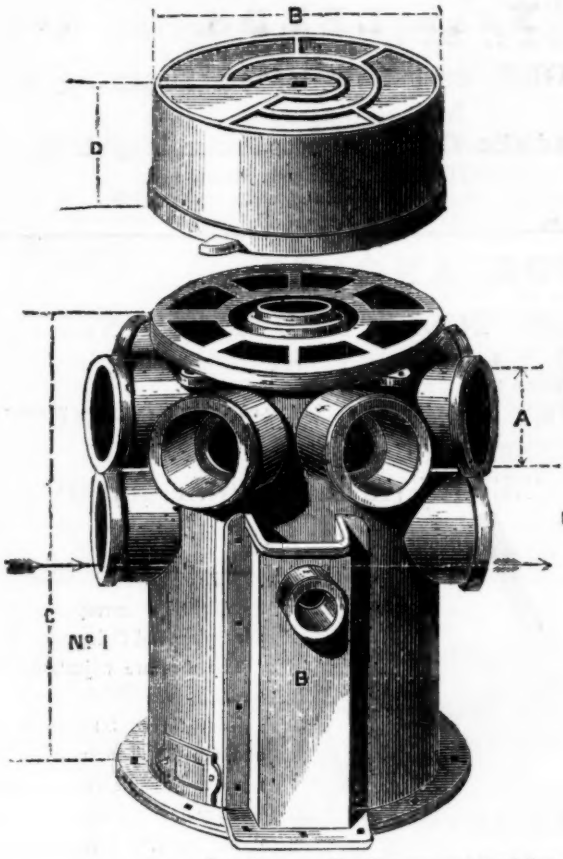
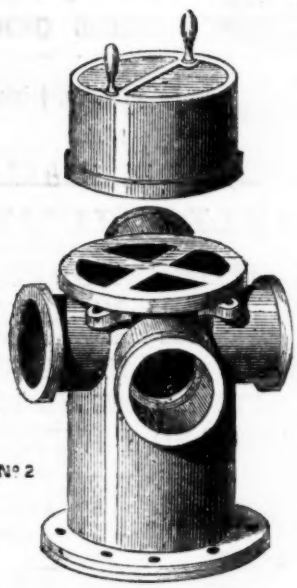
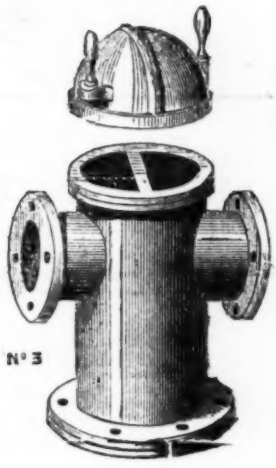
MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.







THORNCLIFFE
IMPROVED BYE-PASS VALVE.
SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE
IMPROVED STOP-VALVE.
SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body .	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	44 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

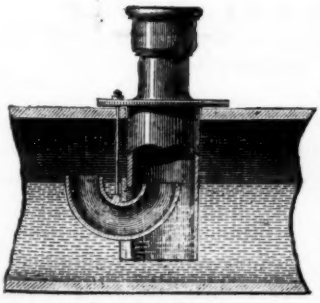
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



DIP-PIPE, No. 1.

Messrs. N., C., and Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING HYDRAULIC DIP-PIPES.

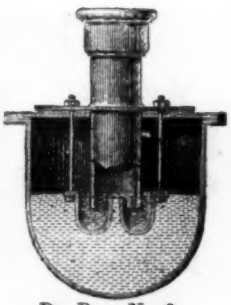
By their use the whole of the pressure caused by the Seal in the Hydraulic Main is entirely avoided, thus securing the many advantages long sought for.

Over 50 Gas Companies have already been supplied with them, many of which have been using them throughout their entire works continuously for over two years.

They can be applied to existing Hydraulic Dips, and at a very small cost.

They seal themselves in the same manner as the ordinary dip-pipes, therefore they are not likely to get out of repair.

By the aid of the adjusting screws they can be made to work on the old principle at pleasure.



DIP-PIPE, No. 2.

FOR PRICES, TESTIMONIALS, &c., APPLY TO

Messrs. NEWTON, CHAMBERS, & CO., Thorncliffe Iron-Works, near Sheffield, Sole Agents;

OR TO THE PATENTEE,

J. G. HAWKINS, NEEPSEND GAS-WORKS, SHEFFIELD.

Established

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JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

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Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

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Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

M. SELIG JUNIOR AND CO.,

IMPORTERS OF

AMERICAN AND OTHER FOREIGN TOOLS AND MACHINERY,

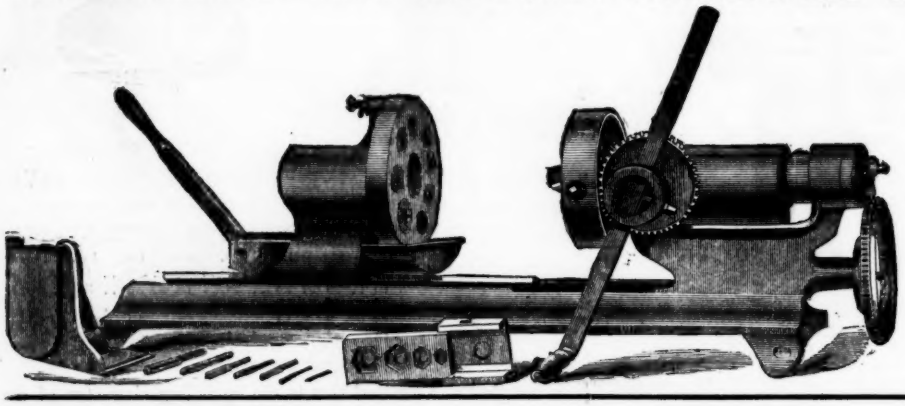
WHOLESALE AND EXPORT MACHINERY MERCHANTS,

SOLE EUROPEAN AGENTS FOR THE

"TANITE" COMPANY'S SOLID EMERY WHEELS AND MACHINERY,

85, QUEEN VICTORIA STREET, LONDON, E.C.

THE "LIGHTNING" HAND AND POWER SCREWING AND TAPPING MACHINES.



They finish their work at one cut.

Nuts and bolts threaded with them always correspond, without trying and fitting.

The dies are adjustable for wear.

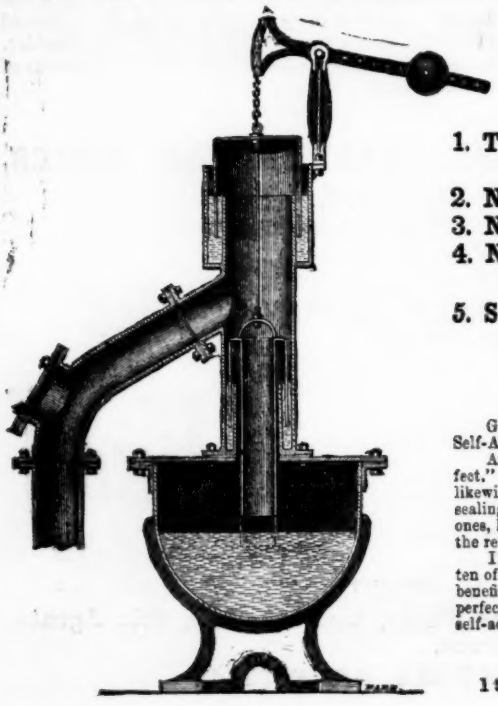
They thread 30 ¾-in. bolts, and tap 30 ¾-in. nuts, in 40 minutes—a day's work by hand.

They may be used, if pipe-dies ordered, for threading pipes as well.

SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

TESTIMONIAL.

Metropolitan District Asylum, Caterham, Surrey, Dec. 14, 1874.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—I have much pleasure in bearing testimony to the complete working of your "Patent Self-Acting Dip-Pipes," which have now been in constant operation over three months.

As regards the action of the apparatus, I can describe it no better than by calling it "simply perfect." Immediately the retort is charged and the lid secured, the small holder rises, which lifts the Dip; likewise the instant the gas is permitted to escape at the mouthpiece the holder falls, thus perfectly sealing the Dip. I am fully convinced of the superiority of these Self-Acting Dips over Non Self-Acting ones, having experienced the fact that stokers do occasionally neglect to unseal the Dip after charging the retort, thereby causing a waste or loss.

I feel that it is quite unnecessary for me to say more on the subject, excepting that, having had ten of Messrs. Chandler's Dip-Pipes in use more than one year, and having experienced the great benefits derived thereby, inasmuch as the yield of gas from the coal is greatly increased, and the retorts perfectly free from carbon and other advantages, and seeing that the same Dip has been made perfectly self-acting by the second patent, I feel convinced that this is the right thing.—Yours obediently,

W. CRICKMAY, Resident Engineer.

For terms of use and cost, apply to Mr. G. W. STEVENSON,

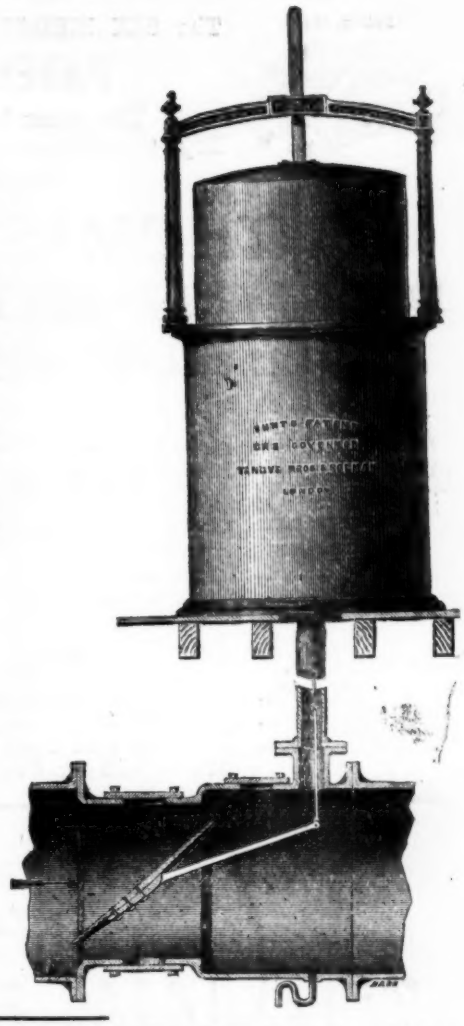
19, GREAT GEORGE STREET, WESTMINSTER.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by several leading Gas Companies, among whom are the following:—

The Gaslight Co.—two 36 in. at Blackfriars.
" " a 36 in. at Goswell Road.
" " a 24 in. at "
" " a 24 in. at Whitechapel.
" " an 18 in. at Bow Common.
" " a 24 in. at Beckton.
" " a 6 in. at "
The London Gas Co.—a 24 in. at Nine Elms.
" " an 18 in. at "
" " an 8 in. at "
The Exeter Gas-Works—a 24 in.
" Abergavenny Gas-Works—a 10 in.
" Birmingham Gaslight Co.—an 8 in.
" Monmouth Gas-Works—an 8 in.
" Devonport Gas-Works—an 8 in.
" Cannes Gas-Works—an 8 in.
" Mentone Gas-Works—an 8 in.
" Rochdale Gas-Works—a 4 in.
" Imperial Gas Co., a 12 in at Great Cambridge Street.

TESTIMONIAL.

The Gaslight and Coke Company, 9, Water Street, New Bridge Street, Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,

(Signed) JOHN JOHNSON.

VIENNA EXHIBITION, 1873.—The highest prize and only Medal "for Progress" for Direct-Acting Steam Pumps for general purposes was awarded to TANGYE BROTHERS AND HOLMAN, Engineers, London, for

THE "SPECIAL" DIRECT-ACTING STEAM PUMPS.

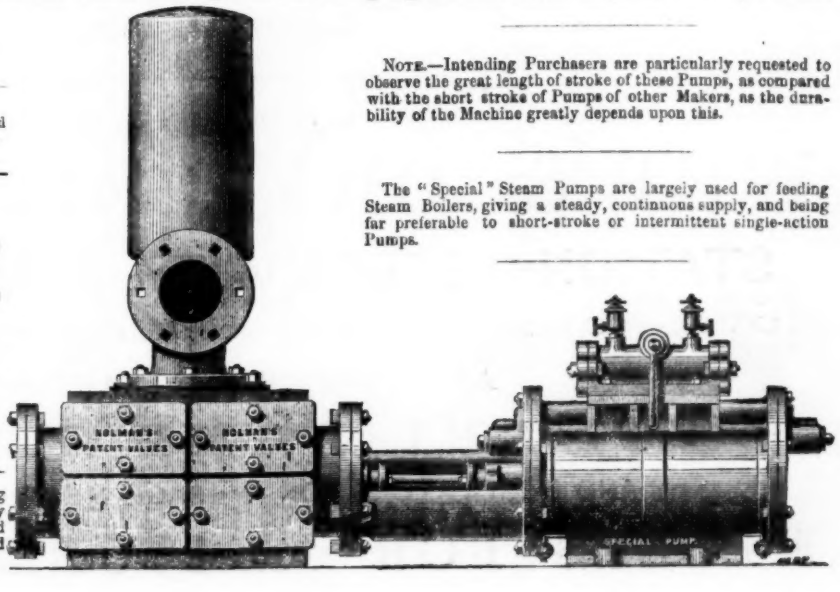
Upwards of 12,000 have been sold in England and America.

In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

The following are a few of the leading Sizes:—

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4*	2	9	815	18
3	3	9	1,830	18
5*	3	12	1,830	22 10
4	4	12	3,250	25
6*	4	12	3,250	30
5	5	12	5,070	32 10
7*	5	12	5,070	40
6	6	12	7,350	40
8*	6	12	7,350	50
7	7	12	9,750	50
10*	7	12	9,750	65
8	8	18	13,000	65
10	9	18	16,500	80
10	10	24	20,000	100
12	12	24	30,000	140

* These sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance piece between steam and pump cylinder at a small extra cost.



NOTE.—Intending Purchasers are particularly requested to observe the great length of stroke of these Pumps, as compared with the short stroke of Pumps of other Makers, as the durability of the Machine greatly depends upon this.

The "Special" Steam Pumps are largely used for feeding Steam Boilers, giving a steady, continuous supply, and being far preferable to short-stroke or intermittent single-action Pumps.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 29, 1875.

Circular to Gas Companies.

We need not hesitate to express our astonishment, and may be expected to express disappointment, at the decision arrived at by the Commons Committee on the Regulations Bill on Friday last. The committee have accepted the Bill of the Metropolitan Board and Corporation of London, with the simple addition of the up-and-down sliding scale suggested by the Board of Trade. Writing at this moment, before the question of standard price is settled, by some modification of clause 6, we are in some doubt as to the ultimate result; but if the standard price of 3s. 9d. be retained, then we say that a distinct breach of faith will be committed, and the Government may fairly be called on to throw out the Bill. It is in evidence—and a contradiction was hardly attempted—that the largest metropolitan companies cannot continue to supply gas at 3s. 9d. and pay maximum dividends. They may do so for this year, and perhaps for the next; but in the future, without a further fall in the price of coal, which is not to be calculated upon, we say that 3s. 9d. is an impossible price. We urge, therefore, that the decision of the committee involves just that breach of faith which the Government have resolved shall not be made. There can be no question that the legislation of 1868-69 gave the Chartered and Imperial and South Metropolitan Companies a distinct guarantee of maximum dividends; by the decision of the committee, this guarantee is removed, and two of these companies are left to chance for their dividends. They may obtain them, it is true; but we may be certain that if any notion had been entertained in Spring Gardens that the upward sliding scale would ever be brought into action, in the case of the Chartered and Imperial Companies, it would never have been accepted.

Mr. Forster wishes to insist that this shall be a final settlement of the metropolitan gas question. He evidently does not know with whom he is dealing. The Act of 1860 was supposed to be a final settlement; but it was soon discovered that it made the gas companies prosperous, and thereupon agitation began. Then came the legislation of 1868-69, and, until the revision clauses were brought into operation, those Acts were considered final; but as soon as the natural and legal effect of the revision clauses was established, then came the renewed agitation, culminating in the production of this Bill.

The simple fact is, that agitation on the gas question will never cease while gas companies are prosperous, or, we might say, while metropolitan gas companies exist. It will spring up with renewed energy if ever one of the large companies should divide more than 10 per cent., notwithstanding the assurances we receive to-day, which are made in the fervent hope and confident opinion that neither the Chartered nor the Imperial Company can for the future divide 10 per cent.

We need not, however, speculate further. The associated companies have wisely decided to carry their opposition to the House of Lords, and, therefore, have taken no part in the discussion on clauses. But, before the Bill reaches the Lords, it will be considered by the Government, and we believe that they will see that, as it leaves the committee, it will involve the breach of faith which they have determined shall not be committed. Failing the consideration of the Government, our hopes must be placed on the House of Lords, who will, we have little doubt, take a more favourable view of the case made out by the companies.

By way of postscript, we may say that the Commercial Company have adopted the suggestions of the committee in their entirety, and their Bill has been reconstructed accordingly. We shall notice it next week.

The Burghs and Populous Places (Scotland) Gas Supply Bill (No. 2), as amended in committee, contains some provisions which must be strongly protested against. Section 18 will give any Scottish local authority, adopting the Act, power to set up and maintain a gas undertaking in any "populous place" in which there is no gas company. To such a provision, as we have said before, there can be no objection. Private enterprise has so fully provided for the supply of gas, that we fancy very few populous places will be found, even in Scotland, to give opportunity for exercising the power which will be conferred by the Bill. The next section is to give a local authority power to purchase the undertaking of a gas company, where one exists, with the consent of three-fifths of the shareholders, and on such terms as may be agreed upon. Here, again, we have no objection to offer. Gas shareholders have a right to do as they like with their property, and, if they voluntarily consent to dispose of it to a body of commissioners, it is their affair. But then comes a provision which we do not like to see in a general measure of this kind. It is to the effect that, whenever a company refuse to sell their undertaking on the application of the local authority, such authority shall have power to proceed as if no company were in existence; in other words, the authority would have power to set up competing works. This is tantamount to giving the commissioners power to make a compulsory purchase; for competition, in the majority of cases, will be out of the question. So far as Scotland is concerned, we do not think that any great harm is likely to result if the Bill should pass; but we have a strong objection to seeing in the statute-book any general measure affirming the principle that local authorities may employ public funds in competing with private enterprise, with nothing, in this case, but the sanction of the sheriff. If competition be ever allowed, it should only be in cases where full investigation, before a parliamentary committee, has fully proved that the company concerned have greatly neglected their duty, or grossly overcharged their customers.

We have no expectation that the Bill will pass; but it has been re-committed, and Sir George Balfour has placed on the paper notices of amendments which would make the measure still more objectionable. He proposes a new clause, which is to fix the price that the local authority shall pay for a gas undertaking. This is an amount to be ascertained by a calculation of the average market value of the shares for the five years preceding the date of the offer of purchase, with 5 per cent. interest until the money is paid. We much prefer that each undertaking should stand on its own merits; and the "amended" Bill proposes that when the company and commissioners cannot agree as to price, the company being willing to treat, the matter is to be referred to arbitration. This is the preferable course. We have said that we do not think the Bill will pass; but we hope, nevertheless, that, since it would establish a mischievous precedent, the opposition to it will be continued, and, as far as possible, strengthened.

The Birmingham Corporation Gas (Purchase) Bill has not gone so smoothly through the committee of the House of Lords as we expected it would. In fact, some very important alterations have been suggested by the Lords, by no means in accordance with the interests of Birmingham. Mr. Chamberlain unfortunately conceived the notion of purchasing the gas companies, in order to make profits for the advantage of Birmingham only. The jealousies of local authorities are extreme, and, therefore, no one is surprised that the outlying Boards, whose districts will be supplied by the Corporation, vigorously protest against having a profit made out of them. They say practically that the profits should be appropriated to the districts in which they are made, and the committee of the Lords to some extent agree with them. They suggest, therefore, that all the profits above 10 per cent. should be divided equally between the Corporation and the Local Boards or Board of Guardians, as may be, in the districts supplied outside the borough. We must assume that it is only the profit made within the district that is to be divided, or

otherwise the proposition is that Birmingham shall be taxed for the benefit of the outlying districts. Furthermore, as our readers know, the Bill, as it left the Commons, provided for the sale of the gas plant in the outlying districts, to the respective authorities, on fixed terms. These are denounced as onerous and illusory, and we are inclined to think that, in the case of West Bromwich, they would be disadvantageous. The Lords now suggest that the terms of purchase should be settled by arbitration, and, if the parties are willing to run the risk of an arbitration, we hardly see why they should not be indulged. Mr. Chamberlain's evident wish was to save the expenses of arbitration, and not merely in the interests of Birmingham. We may possibly learn, before we go to press, how those suggestions have been received by the Corporation. They can hardly entertain them with favour. The Corporation find all the money for the venture, and run all the risks. Moreover, the borough of Birmingham will contribute seven-tenths of the profits to be realized. If, then, it is seriously proposed that the Corporation shall divide all the profits made above 10 per cent. with the outlying districts, it will be a serious question whether or not it will be worth proceeding with the Bill. If it should be decided not to go further, we do not think any one would suffer. The two companies would amalgamate, to the advantage of both; and, as the outlying Boards would be satisfied, there would be peace in the sooty regions of South Staffordshire. [Since the above was written, the Corporation of Birmingham have, in accordance with the suggestions made by the committee, proposed a clause, the effect of which will be to give to the outlying Boards a *pro ratâ* share of the profits above 10 per cent.]

The case, as it stands, may serve as a warning to Local Boards who covet the supply of gas to independent authorities. We have a strong suspicion that the gas supply of the metropolis, in the hands of the Metropolitan Board of Works, would not be satisfactory to all the local authorities. Not long ago we saw it contended in a local print, as influential, for aught we know, as any one of the sort in the metropolis, that the proper way to manage the London gas supply would be to have works for every parliamentary borough, and apply the profits for the exclusive benefit of their several areas of distribution.

The opponents of the Southampton Gas Purchase Bill are not content with procuring the withdrawal of the Bill. They have now turned on the promoters, and are anxious to obtain, as they must eventually, a return of the costs incurred, with the view, we presume, of getting them surcharged if illegally incurred. Seeing that the expenditure was justified by the decision of a ratepayers meeting, we do not think that the mayor, and those who acted with him, need be under any apprehension.

We have already recommended the gas company to forego any legal claims they may have on the Corporation in consequence of the abortive attempt to purchase, and therefore need not hesitate to advise these Radical town councillors to let bygones be bygones, and to pay the money and look pleasant.

In the past week two gas companies have had great success with their Bills in Parliament. The Longwood Gas Company carried their Bill through a committee of the Lords, in the face of a most determined opposition on the part of local authorities, and obtained a maximum price of 5s. per 1000 feet. The Worthing Gas Company succeeded in obtaining a maximum of 6s. 6d. per 1000 feet.

Water and Sanitary Notes.

The Rivers Pollution Bill, as we surmised last week would be the case, has been cut down to the dimensions of a very unpretentious measure. As it now stands, it is, in the first instance, simply to prevent the introduction of solid refuse into streams; and after eighteen months it is intended to completely stop the admission of unpurified sewage into watercourses. The first of these objects we regard as eminently desirable. We have all along contended, and shall continue to contend, that Nature made and intended rivers for drains; but it is no part of our contention that they are to be made receptacles for everything that could be cheaply carried to their banks. The introduction of this solid refuse has, in the case of some rivers, grown to be an intolerable nuisance, involving great expense for dredging operations, and it is time that it should be stopped. This we are glad to see is to be done at once.

As regards sewage, too, we may say that we see no hardship in prohibiting its admission to streams in an unpurified state, after having given to towns a reasonable time for the construction of purifying works. There are now before the public several processes which effect, more or less satisfactorily, the clarification of sewage, withdrawing the suspended matters, and bringing the effluent water to such a state, that natural operations in a running stream soon reduce the dissolved organic matter to an innoxious condition. We say this in opposition to the opinion of Dr. Frankland and his small knot of followers, and in support of our view, we refer our readers to the very important report of the French authorities, who have recently investigated the matter in connexion with the pollution of the Seine by the sewage of Paris. We say nothing of the manure-producing value of the processes alluded to, and should be very sorry to delude any town with the idea that there is at present any expectation of making a profit by the use of them. The more difficult matter of dealing with the refuse of manufactories and mines has been wisely deferred until another session; but it is to be enacted that no new channel of pollution is to be opened in the meantime. In the present state of trade, there may be no great hardship in this, for there is not likely to be a demand for new factories for some time to come.

We are pleased to see that the Marquis of Salisbury has adopted a conclusion we long ago came to—viz., that it is impossible to deal with a single town. The terrible pollution of our rivers, he said, can only be corrected by schemes adapted to each river and each drainage area. We shall wait with some curiosity for the schemes the noble marquis will propound next year, and, in the meantime, may take an opportunity of expressing our own views on the matter.

It seems difficult, if not impossible, to rouse the Corporation of Glasgow to the importance of the enormous waste of water which goes on in their city. It is calculated to amount to not less than 15 millions of gallons a day, and the annual value of the water so lost is estimated at £50,000. The remedy proposed is to fix the *loci* of the waste by districting and by the use of Mr. Deacon's meter, as has been done in Liverpool, and then to deal with the matter as circumstances require. It seems, however, to be considered that the water resources of the Corporation are inexhaustible; but it may be taken as certain that, before many years are over, one of two things will have to be done—either the supply must be economized, or great expense must be incurred in adding to it. There can be no doubt which would be the better course to pursue in the interest of the ratepayers.

We ought to have alluded before to the Birmingham Corporation Water (Purchase) Bill, which will go before a committee of the House of Lords about the time we go to press. This is a measure which both gas and water companies may regard with some alarm. It is a Bill to make a compulsory purchase of the undertaking of the Birmingham Water Company on the purchaser's (the Corporation's) own terms. That such a Bill should have passed the House of Commons is, we believe, quite unprecedented; and the fact that it has done so can, we think, only be ascribed to the inexperience of the chairman of the committee who considered it. An attempt, as our readers will remember, was made to stop the progress of the Bill at the second reading in the Lords, but it was settled that it should go before a committee. The result can hardly be doubtful; but we must most emphatically recommend every gas and water company in the kingdom to petition against this Bill, which, if carried, will constitute a precedent for the confiscation of every undertaking in the country.

Correspondence.

METROPOLIS GAS COMPANIES BILL.

Sir,—There is a slight inaccuracy in your summary of the evidence on the Metropolis Gas Bill. My suggestion to the committee was that the range within which the sliding scale, if adopted, should be inoperative might be from 3s. 6d. per 1000 cubic feet to the maximum price under the Act of 1860, not from 3s. 6d. to 4s. The figures you quote were the chairman's, not mine. The suggestion was, as you are aware, a quotation, and it was a literal one.

Please accept this slight correction as a tribute to your well-known love of accuracy. C. Woodall.

Phœnix Gaslight Company, Bankside, S.E., June 28, 1875.

RIGHTS OF GAS COMPANIES.

Sir,—If "H. T." will refer to the Journal of the 20th of April this year (page 567), he will find that *no assignment* for the benefit of creditors in that case *had been made*—it was only in contemplation. Consequently, the goods were in the disposition and order of the defaulting curate. The magistrate remarks "that the company had great powers, and that he would commit the reverend defaulter to prison in default of payment or distress." This latter power of imprisonment the magistrate only obtains under 8 Vict., cap. 20, sec. 147, incorporated with 10 Vict., cap. 15. There are no such powers under 5 Geo. IV., cap. 78 (Local and Personal, sec. 56). I hand at foot the section relating to distraint from the latter Act. If the assignment or a liquidation *had been made*, the magistrate would have had no power to issue his warrant to distrain, and, therefore, in the event of the return of the warrant, endorsed "*nulla bona*," he would have no right to commit to prison. The magistrate's warrant to distrain gives similar and only equal powers, according to date, with the sheriff's execution for any other debt.

Before any further expense is incurred, I recommend that it should be shown under what section the gas companies claim their preference before any other creditor.

There is a very much more important decision that requires appealing against, and that is one given by the Court of Queen's Bench in the

case of the *Commercial Gas Company v. Scott*, reported in the JOURNAL of June 15 last, page 889.

This, anomalously, decides a model Act (*to be* incorporated), passed in 1871, is incorporated with a model Act passed in 1847; so that a company incorporated in the following year (1848), or in 1861, is to be punished for its default in an Act passed ten years later (1871), a model Act, and in no wise incorporated with its own. This is so important a matter, that it should go up to the Court of Error.

AN EX-SECRETARY.

EXTRACT, SECTION 56, "REMEDY FOR RECOVERY OF RENTS."
Act 5 Geo. IV., cap. 78 (Phœnix).

"And be it further enacted, that in case any person who shall use or enjoy the benefit of the said gas in their premises shall refuse or neglect, for the space of seven days after demand, to pay the sums of money then due for the same to the said company, it shall be lawful for the said company, or any person acting by their authority, by warrant under the hand and seal of any one of the justices of the peace for the county wherein the offence shall arise (which warrant such justice is hereby empowered to grant upon confession, or upon proof of such demand by the oath of one credible witness), to levy the said sums of money in respect whereof such refusal or neglect shall happen, by distress and sale of the goods of the person so neglecting or refusing to pay the same, rendering the overplus (if any) to such persons refusing or neglecting, after the necessary charges of making such distress and sale shall be first deducted: provided always that if, at the time of such distress being made, any rent shall then be due and in arrear to the landlord of the premises in which such goods shall be distrained, such landlord shall have so much rent in arrear as the said landlord would be legally entitled to receive in the case of an execution levied under any judgment entered against the tenant in any of His Majesty's Courts of Record at Westminster."

THE AVERAGE METER SYSTEM.

SIR,—In your JOURNAL of the 22nd inst., I notice a letter from Mr. Clutterbuck, the Inspector of Public Lighting of St. Pancras, recommending meters to be placed inside the public lamp-columns, instead of in the boxes underground, near the foot thereof, as directed by the Government gas referees, Professor Tyndall, and others. From my own observations and experience, I find that meters placed in the base of a lamp-column are exposed to many more risks and disturbing influences than those placed in the ground near the column, providing the meters be firmly fixed in cast-iron boxes doubly secured with air-tight lids, judiciously and carefully connected. The gas referees, before issuing their official notification, fully considered this important subject, and it seems somewhat inconsistent, now that the system prescribed by them has worked with such advantage to the ratepayers, that Mr. Clutterbuck should take such an early opportunity of suggesting a modification of their plans. The referees, in issuing their opinions and recommendations, state: "That they have collected extensive data as to the mode of measurement adopted in various towns; have visited some of those towns to make personal *examination of the arrangements;* have tried many experiments, and have given careful attention to the communications they have received on the subject from both the parish and the Imperial Gas Company."

As regards Paddington, the notification has accomplished what was desired, and I feel convinced that it will be to the interest of other parishes, about to adopt the meter system, to follow the advice of such eminent men as Professor Tyndall, Dr. Pole, and Mr. Harcourt, who have made the *best arrangements* to be adopted in carrying out the average meter system their especial study.

GEORGE WESTON.
Paddington, June 26, 1875. Inspector of Public Lighting.

TINDALL'S PAPER ON RETORT-SETTINGS.

SIR,—Will you allow me to draw your attention to one or two corrections in my paper, which I think should be pointed out?

In the engravings, at plan A B, there is the centre wall shown as surface, which should be section, and the flues underneath the lower retorts shown as section, which should be surface; then the brickwork on the side of the furnace is shown surface, which should be section. In the transverse section there is a 4½-inch wall between the two retorts nearest the sides of the arch, which is shown as flue, and should be section.

Then again, in the paper, a correction is necessary in the chemical reactions, where it reads as follows:—$C + O_2 = CO_2$; $CO_2 + C = 2\,CO_2$ it should be 2 CO and not $2\,CO_2$, as they are two molecules of carbonic oxide and not carbonic acid.

The second correction is a very important one, and is as follows:—"For every unit weight of hydrogen which we burn, we obtain, with oxygen, its calorific equivalent, a quantity of heat which would raise 34,462 times that weight of water 18° Fahr." It should be 1·8° Fahr; there is, or should be, a decimal point between the 1 and the 8.

The next occurs in the latter part, under the heading of results; it reads as follows:—"And during the last four years was of a similar price to that which was used during the three previous years." It should be, "And during the last four years *the coal used* was of a similar price or quality to that which was used during the three previous years."

I am sorry to have to trouble you with these corrections, and perhaps some of them are my own mistakes; but it is necessary they should be pointed out, as they are not the truth as stated.

JNO. TINDALL.
Walsall, June 26, 1875.

REDUCTIONS IN THE PRICE OF GAS.—The directors of the Maidstone Gas Company have announced a reduction from 4s. to 3s. 6d. per 1000 feet, commencing on the 1st of July. The Northampton Gas Company have further reduced their charge from 4s. 3d. to 4s. per 1000 feet, to take effect from the 24th inst. This will make the price of gas the same as that charged before the rise in the price of coals. At Hebden Bridge the price has been reduced from 5s. to 4s. 7d. per 1000 feet. Our correspondent, in his "Trade Notes from Scotland," notices the several reductions of North British companies.

THE GAS-EXAMINING DODGE.—CAUTION TO CONSUMERS.—At the Liverpool Police Court, on Wednesday last, the prisoner, John Williams, was brought up on remand on four charges of theft from various houses. The prisoner displayed great ingenuity in obtaining access to these houses, and—it is said, in many cases besides these—succeeded in carrying off his plunder. In some cases, he represented himself as having been sent from the gas office to examine the gas-pipes and fittings. In others, he said he had been sent from respectable establishments, and he either took away with him articles to be repaired, or otherwise made use of his opportunity to steal small valuables. He generally contrived in these cases to visit the houses when the master or mistress was absent. The prisoner was committed for trial.

Parliamentary Intelligence.

METROPOLIS GAS COMPANIES BILL.

On Monday, June 21, Serjeant Sargood commenced his speech on behalf of the Chartered Company, and occupied the whole day and a considerable part of the Tuesday following. In the course of his powerful and energetic appeal he complained bitterly of the present course of the Metropolitan Board in coming to Parliament to induce it to break faith with the gas companies, and to deprive them of an Act, the provisions of which they had loyally obeyed, and which was in the first place absolutely invented by the corporation and the Metropolitan Board, being forced upon the companies. He contended that there was an entire absence of cause shown for change of legislation. The corporation, on the question of illuminating power, had made a covert charge against the Chartered Company, which they had felt to be one of the most unjust which could have been brought. But here he might point out that the agitation did not begin in the City of London, and why, therefore, the corporation had appeared simultaneously with the Metropolitan Board he could not say, unless the latter had gone to them and asked them to back up their bill—to give them the light of their countenance, at least, and, he presumed, of their purse also. The charge he referred to was contained in the evidence of Mr. Young, and had come out by misadventure. But although the charge had not been foreshadowed, and the promoters disclaimed all intention of making it, he (Serjeant Sargood) looked upon it as a most material one, and he seriously complained of its having been sprung upon his clients without the introduction of a speech or a hint that it was to be made. The company admitted the 16-candle obligation, and they were testing every hour of the day, and had a tell-tale watch kept on the illuminating power to put them on their guard at all times. The result of these testings and this watching would be given to the committee in evidence, and he had not the slightest doubt that they would be of opinion that the charge, as well as being accidental, was undeserved. With reference to the clauses in the bill having reference to the audit, he described them as clauses to give power to overhaul the books of the companies, and for the Metropolitan Board to be their own auditors, and assist Mr. Parkes in his duties. Mr. Parkes was a servant of the public, and whenever there was a reasonable doubt in the accounts of the company he was appealed to, and his decision taken. Hitherto everything had gone on harmoniously, and he (Serjeant Sargood) trusted that the committee, if they made no other alteration in the bill, would strike out that part dealing with the audit, and so prevent the sowing of discontent and discord where all had been contentment and harmony. He called attention to several other clauses of the proposed measure, and contended that such alterations in the existing law would only promote litigation instead of avoiding it, as the present system did, and had not finished his address when the committee adjourned.

Serjeant Sargood, on Tuesday, resumed his speech by calling the attention of the committee to the events which occurred in 1873 and 1874, with a view to show that the inquiry before the commissioners, as to due care and management, was by no means crippled or limited, but was to the utmost extent, and upon every branch of the company's trade, not alone open to the commissioners but to the company's opponents. He maintained that those parties availed themselves of this fact, and amply and fully discussed every point they thought worthy of discussion. He pointed out that on one occasion the Metropolitan Board had asked for information under 17 heads, each query involving a long and detailed answer. The whole of the information required was, without the slightest demur, prepared for the board by the company's *employés;* but although it took days and nights to collect, he would undertake to say that one-half was utterly useless and immaterial to any one. The company had always been equally ready to give information, and that being so, with what justice could it be said that under the existing state of the law the board could not get at the facts it required with reference to the internal working of the company, without having access to the books? So far from the inquiry into the question of due care and management being a hypothetical one, leading to nothing practical, the result of the statute was eminently practical. Serjeant Sargood next addressed himself to the proposed sliding scale. He had tried hard to theorize it, but he had failed to find it was a logical proposition. A sliding scale meant fitting a burden to the back, as a general rule; but, in the present instance, looking on it as a commercial matter, it did not mean anything of the kind. If price was to be the engine out of which profit was to be made, it was quite an illusion to say, "The lower you make the price, the more profit we shall allow you to divide." If it could be proved to him that the lower he made the price the more profit he could gain, then he could understand the promise of the promoters, "The more profit we will allow you to divide." But he should like to see how increased profit was to be got by decreased price. As a commercial theory it was absurd. He could imagine the price being lowered to such an extent as to bring the profit down to *nil*. In a gas company there was a certain normal increase in business year by year, but it was very small. One could not look upon a gas business as one to be pushed by reducing the price of the article. He further contended that the bill was unfair and a breach of faith. It was not honest for the Metropolitan Board to come, and by a state of terrorism and theoretical distrust to ask the committee to put aside an engagement which had been willingly entered into, and which had been honourably carried out by the companies, and to launch them upon the sea of discovery which he was sure would only result in the promoters again coming to Parliament with the cry, "Down with the sliding scale." In conclusion, he asked the committee, in the name of common sense and in the interests of commercial effort, not to disorganize the whole legislation of 1868, until more ample time had been given to develop its intention and its results, and until, by that development, they were driven to say that the thing had become abortive and unsuccessful, which, he would venture to say, at that moment in no one point had been in the slightest degree proved.

The following witnesses were then called on behalf of the company:—

Mr. G. C. Trewby, the manager of the Beckton works of the Chartered Company, examined by Mr. West, said he did not believe the great change in the illuminating power of the gas, in the short time described by Mr. Heisch, was possible. He was informed Mr. Heisch had only been to Beckton once during the last six months. Though he was the proper person to receive them, no complaints had been made. He pro-

duced the testings taken at the works, which were totally different from those given by Mr. Young in his evidence, and which were taken at the testing-place 1000 yards from the works. His instructions were to have the gas kept up to 16 candles throughout the whole day. For the nine months ending March, 1875, the average of the 1426 testings made was 16·32 candles. Witness then explained the various modes of testing, and how an error might arise in the returns made by the official testers. He then described the nature of the works, and the facilities afforded for the easy and quick unloading of coals and depositing them in the retort-houses, as also their means of disposing of their residuals. When the extensions now in hand were completed, they would be in a position to manufacture 27,000,000 feet a day. The return of the different stations were compared so as to test the economical working of each. In cross-examination he said that the Beckton works were to provide the necessary increase in consumption during the next four or five years. They manufactured gas as economically there as anywhere. He thought they bought coal as cheaply as any one. Except as regarded the sale of coke they had an advantage over the other companies. The proposed extension would only be in proportion to the increased quantity of gas to be made. The company's testing-place was open for the official gas examiner if he wished to visit it. He had complained that Mr. Young's tests did not agree with their own, but Mr. Heisch said they did not show more than the general difference. In re-examination he said he had not heard of the unofficial tests taken by Mr. Young before. Their gas was two candles better than that of any other company in London. It was the intention of the company to close the Horseferry Road works in addition to those already shut up at Blackfriars, Brick Lane, and Curtain Road. They sent their gas a distance of 17 or 18 miles, and had their leading mains tested from time to time, and found them practically tight. In reply to the committee, he said they sometimes used cannel coal for raising the illuminating power of their gas but it was a slow process; it took about an hour to raise it one candle. They paid the same for wages at Beckton as elsewhere, and had no difficulty in getting men. They had cottages on the works for some men, and brought others by rail. In the winter they employed about 1000 men at Beckton.

Dr. Whitmore, medical officer and gas examiner for Marylebone, said he was in the habit of testing the gas of the Chartered and Imperial Companies. The former supplied two kinds of gas—cannel and common. The testings were conducted by an assistant, and supervised by himself personally. He used Dr. Letheby's bar photometer, and the apparatus and the mode of testing were in strict conformity with the regulations ordered by the gas referees in their memorandums which were issued in 1874 and 1875. The testings were made at all hours of the day, but not very often at official testing hours, for the reason that his assistant was engaged at the testing station. The general result of the last five years testings of the Chartered Gas Company's gas showed that the mean illuminating power was 16·6 candles. The mean of the monthly testings for the entire five years always exceeded 16 candles, except upon one occasion. In October, 1870, the mean was 15·9 candles, but in seven months of the entire five years the monthly mean exceeded 17 candles. In 28 other months of the entire five years the monthly mean exceeded 16·5, reaching on many of those occasions to 16·9. The actual lowest illuminating power of any single testing throughout the five years was 15 candles, and taking the mean of all the lowest testings in every month during the five years, it was 15·9 candles, or 1-10th less than the mean—that is, the actual lowest. The mean highest in the same months was 17 candles, but in single testings it frequently reached 18 candles. His testing-place was about 15 miles from Beckton, and he could not help thinking some illuminating power must be lost in the journey. The amount, he thought, depended on the rapidity the gas travelled through the mains. It was supposed to become purer by travelling along the mains, and it deposited naphthaline, which was a very offensive material, choking up the mains, and very often causing a reduction in the quantity of gas burnt by the lamps. For that, however, he did not think the gas companies could be held responsible. There was no doubt gas would lose more in getting to Marylebone than it would in getting to the City from Beckton. He hardly thought it possible that the illuminating power of gas could be altered in such a short time as stated by Mr. Heisch. Any complaint as to the quality of the gas in Marylebone would come to him as gas examiner. He had taken an opportunity, for his own information, as well as for the information of the vestry, of consulting with some of the largest gas consumers in Oxford Street, where the Chartered Company supply their gas, and the only complaint he had heard was that sometimes the pressure was not sufficient in the early hours of the evening. In one establishment, where they pay £1600 a year for gas, the senior partner of the firm said he had no complaint whatever of the quality or the price, although he did not approve of the latter last year. Witness had heard complaints from householders, but, as a general rule, it was found that the state of things objected to arose from some defect in the fittings or pipes in their houses. In reply to the chairman witness explained that the absence of complaint would apply as much to the Imperial as to the Chartered Company. A person who was unable scientifically to test the gas would not find any difference in the two companies gases.

On Wednesday, Mr. G. W. Wadbrook and Mr. F. Beale, the men who have charge of the testing at the Beckton works, were called to explain their modes of procedure, and to prove the accuracy of the tests mentioned by Mr. Trewby on the previous day. The former took the tests, which were afterwards corrected by Mr. Beale, who said the apparatus at the works was quite open to the inspection of the official testers if they liked to come. The jet photometer used gave a rough result for the men, without going through a lengthy experiment. It was tolerably accurate—within half a candle. He had seen the evidence of the gentlemen who said the gas varied two candles in 10 minutes, and his opinion was it could not be so.

Mr. F. J. Evans was the next witness. He said he was one of the referees appointed under the Act of 1868, but resigned his office in 1870. He was formerly engineer-in-chief, and was now a director of the Chartered Company. The Act of 1868, he considered, worked very well when he was a referee. He had no objection to urge against it. He then described to the committee the works that have been, and are being, created at Beckton, the extent of the works, and the mode of purification pursued. He thought that, when the works were finished, the other companies could be supplied with gas in bulk from them; indeed, a business of that kind was contemplated, although the works were not constructed solely with a view to it. This supply would obviate the necessity of those companies extending their works in the metropolis, and, therefore, of increasing their capital. The leakage of the Chartered Company had been reduced from 16 per cent. to between 9 and 10 per cent. This had been effected since the amalgamations had taken place. He did not think it would be reduced much lower. Their leakage was greater in proportion, through their having to keep two sets of mains in some of their districts for the supply of cannel as well as common gas. Witness was cross-examined on the saving made by removing to Beckton, and selling the old works in the City and elsewhere, on the saving of leakage, and on the amount of cannel used in their gas, all of which will hereafter be fully reported. In reply to the chairman, witness said the amount of cannel used by the Chartered Company would account for the difference in cost between their and other companies coal. As a general thing, the consumers in the old western district were satisfied with the change from cannel to common gas. The consumers paid meter-rent, and there was not much complaint of the meters being out of order.

Mr. Field, accountant to the Chartered Company, stated that in the year 1874 he prepared the accounts for the revision. There was no difficulty experienced in carrying on the work, and the information required by each party was furnished systematically. At this revision a great point was made of the large amount of leakage, and the result was it was decreased in the next year from 17 per cent. to just over 9 per cent., which effected a saving of 36,755 tons of coal in the year 1874. Supposing there had been no revision, the dividend on the ordinary shares would have been just under 3 per cent. in 1873, and the company would have been unable to pay its debenture debt in 1874. It was impossible to compare the Chartered with the other London companies, from the fact that they had to supply two qualities of gas. Witness then went through various figures, showing their sale of coke, cost of purifying, amount paid for cartage, wages, &c. He dwelt on the question of capital, how it had been raised, and what was the capital of the amalgamated companies, with the interest and present price of each class of shares and debentures. He handed in various tables that he had prepared, among others a statement of the share and loan capital of the Chartered Company on June 5, 1875; a statement of the capital raised from Dec., 1861, to Dec., 1874, and the rates at which it had been raised; particulars of the capital which, for reasons given, was unproductive; table showing how the company obtained their present capital; statement of dividends paid by the company from 1860 to 1875; the prices charged for gas from 1860 to 1875; table showing the number of consumers and the average consumption; statement of the comparative cost of coal delivered into the retort-houses at the company's several stations in the year 1874; and the greatest make of gas in one year at the stations now closed. The witness was examined and cross-examined at considerable length on the figures in these tables, the report of which we reserve.

Mr. S. A. Beck, the governor of the Chartered Company, was called, but Mr. Cripps said he had no questions to ask him.

Mr. West then stated that the case for the Chartered Company was closed.

On Thursday, before Mr. Cripps commenced his speech in reply, the chairman said that a very important point of the bill was the possible prevention of the companies earning 10 per cent. dividend. It had been strongly alleged by the companies that they had a vested right, not to a guarantee of the 10 per cent., but that they might, by the help of the revision, charge up to 5s. 6d., in order to get their 10 per cent. He did not doubt but that Mr. Cripps would direct his remarks to that point, especially when he knew it was one on which the committee would be glad to have his views.

Mr. Cripps commenced by congratulating the committee upon having arrived at the last stages of the inquiry. It had certainly been long, and not altogether uninteresting, and if it resulted in settling the much vexed gas question, and satisfying all parties, no time would have been thrown away in the consideration of the bill. He then went on to say that the Legislature had the most perfect freedom to deal with this matter; indeed, it was their duty to deal with it from time to time for the protection of the consumers. In the year 1860 Parliament conferred on the companies an immense boon when an Act was passed which stopped competition. Parliament thus gave them more than any possible restrictions could have taken away. After 1860 the gas companies enjoyed great prosperity, and from a certain date all the companies dividends went up to the maximum, and now the companies said Parliament had not power to interfere for the protection of consumers. One of the results of the Act of 1860 was by a slip to allow the gas companies to supply worse gas, and the public naturally felt dissatisfied when they were paying more and not getting so good an article. Great dissatisfaction arose, and the Board of Trade introduced a bill in 1866 for the purpose of further regulating the gas supply. When that bill was in committee, it was not suggested that Parliament had no power; indeed, there was never any doubt as to their full power to deal with the matter. Parliament had created a monopoly, and certainly had the power to regulate it in the interests of the consumers. With regard to the revision clauses, it was no defence to say that the Metropolitan Board of Works approved of those clauses when they were first enacted, for the Board of Works had found that they did not work well. The first thing proposed by this bill was that those clauses should be struck out and others more efficient substituted. The consumers were dissatisfied with them, and always would be, for wherever they were put into operation the price was increased, and so they had a grievance. The promoters had put 3s. 9d. as the initial price in their bill, and provided that if anything was earned above 10 per cent. at that price it should go to the consumer. When it was proposed to put in the sliding scale to act both ways, he made no objection. He was prepared to stand by the price of 3s. 9d. as a fair price. It was the price of the Act of 1868, and was the initial price of more than two-thirds of the metropolitan companies. It was higher than the price of the South Metropolitan Company, and was the present legal price. He contended that it was a fair price for the companies, and a liberal price for the consumers. He then went through the various provisions of the bill, and had not concluded his address when the committee adjourned.

On Friday Mr. Cripps resumed and concluded his reply on behalf of the promoters. He dwelt upon the probable rise or fall in the price of gas in

the future. It was plain, he said, that all that could be done with regard to the future was to prepare some elastic machinery to meet either a rise or a fall in the price of coal. There had been some evidence as to the price of coal in the future which was more certain, and on which they could rely, and it was all in favour of the probability of the lowering of the price. Then the rate per cent. upon which capital was to be raised in the future would be materially less than it had been hitherto. He contended that 5 per cent. would be ample for any new capital. With regard to the sliding-scale, if it was to ensure due care and management on the part of a company, it would fail if it went to any extent one way, but stopped the other way at 3s. 9d. He considered it an extraordinary thing that they had so little opposition to the sliding-scale on the part of the companies, and concluded by saying there were many matters of minor importance to which attention had been called; but as to the matter of great importance, the preamble of the bill, he hoped the committee would pass it in the interests of the consumers. It was perfectly satisfactory to them, and would give full justice to the companies themselves.

The committee then consulted together, and, on their return, the chairman said that, before he called Mr. Reilly and other gentlemen whom the committee had decided to examine, he would be glad to know whether it was the wish of the parties concerned that the committee should take the question of the preamble before the clauses. The committee had a strong opinion that to settle the preamble first would be the better plan.

Mr. F. S. Reilly was then called, and examined by the committee. He said he was one of the commissioners in all of the three revisions that had taken place under the Acts of 1868-69. He had had a good deal to do with gas legislation from 1866 downwards. He drew the Corporation Bill of that year, the Board of Trade Bill of 1867, and the Consumers Bill of 1868. He had since then done a certain amount of work for individual companies, drawing their bills, and settling some of their schemes. He was then examined as to the 1867 bill in its original form, and as amended both by the House and the committee to whom it was referred, and how this resulted in the bill brought in in 1868. He then described the mode in which the three revisions had been conducted, and the evidence that had influenced their decisions. He had no suggestion to make to the committee to meet the point of dealing with the raising of capital, but thought that the arrangements as the insurance-fund and reserve-fund might be altered in the interest of the consumers. It also seemed to him that the official power under the 1868 Act might be more concentrated. There were the referees to fix the standard of the gas and the burners, the chief gas examiner, and the official auditor appointed by the Board of Trade, and, in the case of a revision, the commissioners. He thought it might be very wise to combine those officials into some one body, uniting their functions and giving them proper power. It seemed to him there was a great deal of friction in working the system, and an enormous expense to the consumer, who ultimately must pay the whole, besides a certain amount of ill-feeling produced. What he suggested was, that, instead of having such a proceeding as the revision, coming periodically, as at present, there should be some system of continuous revision. He thought the power given to the companies of raising money by loan, and then converting it into share capital, was a very questionable one. With regard to borrowing, it was possible that even the Metropolitan Board, which had the power of lending to other bodies, might assist the companies. He thought there was a great deal to be said in favour of the system of altering the price of gas under the Act of 1860, as against the system of 1868. He believed, if the commissioners had been appointed, one by the Board of Trade, one by the companies, and one by the Metropolitan Board, it would certainly have tended to facilitate the obtaining of information. He did not think the commissioners should have full power to inquire into the raising of capital. As a matter of parliamentary policy, he thought it was a thing that could not be dealt with by the commissioners. He went further, and said he could not see how Parliament itself could deal with it. He thought that the companies might, in some instances, have raised their capital under more favourable circumstances.

Mr. W. P. Pattison, another of the Revision Commissioners, was the other witness called by the committee. He said, personally, he went outside the evidence before the commissioners in drawing conclusions. For instance, in the question of leakage of the Chartered Company, which appeared to be excessive in 1873, he made inquiries abroad, especially in Paris, as to the amount of leakage of the companies there, and an express caution was given that led to a considerable reduction in the following year. He, individually, had come to the conclusion that the capital had not been raised in the interest of the consumers, and that there had been unnecessary expenditure. With regard to coals, he made an independent inquiry among the best informed men in the market, which led him to a different conclusion to that which appeared in the evidence, and modified the final decision. Witness was then examined by Serjeant Sargood and Sir E. Beckett as to the advisability of the commissioners making inquiry into the raising of the companies capitals and their expenditure on new works.

The room was then cleared, and after about three-quarters of an hour the parties were again called in, when the chairman said that the committee had unanimously come to the conclusion to pass the preamble of the bill, and to proceed with the clauses before they considered the other bills. They had been taking into consideration what Sir E. Beckett suggested; and although they did not think it necessary to pass any resolutions which would appear in the formal proceedings of the committee, had no objection to state their view with reference to two or three of the principal clauses. The principal one was undoubtedly clause 6; and, with reference to that, he said they were prepared to accept the principle of a sliding scale, but thought it should be uniformly applied in treating the different companies under the bill. As to clause 23, they thought a burner should be prescribed in order to keep up a standard measure of price, and as regards the referees clauses, beginning at clause 9, they considered that all the referees should continue to be appointed as at present. He had stated what was their present mind with reference to these important points, but had not put them into the form of resolutions, because they did not wish to give them that definitiveness which resolutions would imply, and especially as regards the important matter of clause 6. They had come to these conclusions because they believed it would conduce to the interest of the companies quite as much as to that of the consumers; and believing that it was proposed *bonâ fide* by the authorities, and with the intention of adhering to it, should it enable the companies to earn more than 10 per cent. dividend.

In reply to various questions, the chairman said the bill would affect those companies that either were existing at the time of the passing of the Act of 1860, or which have been formed by the amalgamation of those companies since. The committee did not propose to ask the promoters to include in the bill any companies which were not already under it. They would leave the question of the reserve-fund for the present, and as regarded the initial price, they thought that was a matter for consideration in a clause. They were very anxious that the clause should be finally framed so as, if possible, to satisfy both parties, for they really believed it involved a principle advantageous to both sides. He thought they should be misleading the companies if they gave the impression that they thought 3s. 9d. too low a price; but, speaking on behalf of his colleagues, he said that was a matter which they should not settle at that particular moment, but which might be considered in a clause. They considered that the principle of all the companies being raised to 16 candles was contained within the meaning of "uniform treatment." He meant that to be understood, and he thought also, without pledging themselves in any way, that the reserve, contingent, and insurance funds should be upon the same principle for all the companies.

On the assembling of the committee yesterday, Mr. Venables, on the part of the associated companies, asked the committee to allow him to be heard in the discussion on the clauses, he reserving his right to oppose the bill in the House of Lords.

Mr. Cripps opposed the application, which, he contended, was without precedent. It was the rule that, if petitioners elected to be heard on clauses in one House, they could not oppose the preamble in the other House.

After some discussion, Mr. Venables said: I am very unwilling to say, but I must, that we withdraw from the opposition to the clauses in this House.

Mr. West: And I, on behalf of the Chartered Company, beg the committee to accept a similar statement from me.

The committee then proceeded to settle the clauses.

HOUSE OF LORDS.

MONDAY, JUNE 21, 1875.

The Barrow-in-Furness Corporation and Chelsea Water Bills were read the third time, and passed.

The Broadstairs Water (No. 1) Bill was reported, with amendments.

GAS AND WATER ORDERS CONFIRMATION BILL.—This bill was reported from the select committee, with amendments, and committed to a committee of the whole House.

The Manchester Corporation Water and Improvement Bill was referred to a select committee, consisting of Earl Airlie (chairman), Earl Strange, Lord Lovel and Holland, Lord Silchester, and Lord Lyveden; to meet on Thursday, June 24.

TUESDAY, JUNE 22.

The CHAIRMAN of COMMITTEES informed the House that the opposition to the Manchester Corporation Water and Improvement Bill was withdrawn.

The Busby Water and Hamilton Water Bills were reported, without amendment.

The Kilmarnock Water and Alford Gas Bills were reported, with amendments.

GAS AND WATER ORDERS CONFIRMATION BILL.—This bill passed through committee, and was reported, without amendment; to be read the third time on Thursday, June 24.

THURSDAY, JUNE 24.

A report was read from the select committee on the Waterford Improvement Bill, that it is not expedient to proceed further with the bill.

The following bills were reported, with amendments:—Newport (Monmouthshire) Gas, Worthing Gas, Tunbridge Wells Gas, Blackburn Water, Longwood Gas.

The Broadstairs Water (No. 1) Bill was read the third time, with the amendments, and passed.

GAS AND WATER ORDERS CONFIRMATION BILL.—The amendments to this bill were reported, according to order; and bill to be read the third time on Friday, June 25.

POLLUTION OF RIVERS BILL.

On the order of the day for going into committee on this bill,

The MARQUIS of SALISBURY said he had kept the bill on the orders of the House for a period considerably longer than was originally intended. That was due partly to the fact that, ever since the second reading, an unfailing stream of deputations had occupied his attention, although he had no idea, until very recently, that the measure could have excited so deep and lively an interest among various classes of persons. Another reason which had induced him to delay proceeding with the bill in committee was that he was anxious to arrive at some greater degree of certainty at the limits of legislation which would be prescribed by the progress of business elsewhere. If it had been necessary to consult only their lordships' time and willingness to work, it would be easy, he had no doubt, to deal with the whole of the subject, complicated though it might be, during the present session; but the consideration of the state of business in another place had led him to the conviction that no measure of great complication could be submitted to the House of Commons, at the present moment, with any chance of passing into law. It became, under those circumstances, necessary for the Government to consider whether they would reduce the bill by mutilating its proportions, or withdraw it altogether; and he had endeavoured to ascertain the opinion of numerous deputations on that point. He found there was a pretty strong feeling that some of its provisions ought to be placed on the statute-book as soon as possible, even although those of a more complicated character would have to be deferred to a more convenient season. Now, the bill divided itself into three principal heads. The first subject with which it dealt was the question of keeping solid pollution out of rivers, and upon that point he found that very little difference of opinion existed, and that persons in all parts of the country were strongly in favour of having that portion of the measure proceeded with. He had deemed it desirable to make it more stringent only in two particulars. It appeared that a great part of the solids which found their way into rivers, and blocked them up, was not absolutely thrown into them, but, having been placed upon the banks, was swept in by the floods. As the bill had stood, it would not remedy that evil, and it was proposed to make it an offence to cast solid pollution into a stream, though the amount cast by any one person at one time might not be sufficient to interfere with the natural flow. He hoped, even at this period of the session, that was a provision which would be placed on the statute-book. The next question was that of sewage, and it was not a question of much difficulty or complication, though he could not say the same unanimity existed with respect to it. In permitting sewage to be cast into rivers, it became necessary, as a rule, to deal not with individuals, but with corporations invested by law with special powers. The offence, he might add, which was one of recent date, arose from injudicious attempts to provide for the

public health, and was in no way connected with private interests. There need be no risk run of ruining the persons who might be required to purify their sewage, because they were corporate bodies, who had the purses of the ratepayers at their command. He therefore proposed that they should cease to cast their pollution into the rivers of the country after a limited period, or take means to purify it. He did not think there would be any harm in that, because in his own county the thing was already done, and he hoped Parliament would not find the provisions of the bill under that head too complicated to prevent their becoming law this session. But the three points and real *crux* of the question was how to deal with the mining and manufacturing interests. The proposal first made with regard to it in the bill had met, he was bound to admit, with universal condemnation, and he did not intend to press that proposal further. The real difficulty in the matter lay in the fact that all the factories from which pollution flowed were, as a rule, built in towns and were close together. In such cases the difficulty in the way of each individual destroying his own pollution was almost insurmountable, and, as the bill stood, it imposed on the manufacturer an obligation of the great difficulties in connexion with which he was not aware. He was, indeed, almost afraid to mention some of the higher figures which he had heard quoted; but taking two million gallons a day, and assuming it to require 24 hours for any chemical to effect the necessary purification, it would be necessary to have a pit 25 feet deep and an acre of ground. It was obvious, therefore, that purification could in such cases be accomplished only by carrying the polluted water altogether away. Now, each individual could not himself drain, and the sewage authorities protested most loudly against any compulsion in that way; because, not only would the sewage return again, but dangerous gases would, he was informed, be generated, which would force their way back into the houses. As the purification must be not individual but collective, it was obvious that the duty must be thrown on the locality as a whole. It was as a body that the manufacturers created the evil, and as a body they must correct it; and they could only correct it by means of special sewers, which would carry the pollution to some distant place where its ill effects would not be felt. But that was not the only difficulty. In some places those dye-works obtained their water from waterworks or wells, and that was water to which the riparian owner had no right, and of which they might deprive him. They might take it, conduct it away, and no harm would be done. But in many cases the water was obtained from the river itself; and if they took it away by artesian wells, the consequence would be that the riparian owners lower down, who wanted the water for their steam-engines, would be seriously injured. The result was that any effort to correct the terrible pollution of rivers in manufacturing towns could only be made effectual by means of a scheme for each river, to be carried out by some authority on which they should place an obligation like that imposed some years ago on the Metropolitan Board of Works, which was charged with the duty of providing for the general purification of the river. What that authority should be—whether it should be a local Conservancy Board or some other body—was not a matter to be decided now, but might well be left for future discussion. Their lordships, he thought, would unanimously agree in the proposition that the provisions required for vesting in any such authority the necessary powers for fulfilling that task would be so large and so complicated, that the attempt to carry them through the House of Commons at the present time would be impracticable. He therefore proposed to defer that portion of this legislation until next year. He proposed, however, to provide that where the pollution from manufactories came by a channel which it did not come by at the beginning of this year, it should be unlawful, so that they might start from this year and declare that there should be no further pollution of rivers. If so simple a provision had been passed 10 or 20 years ago, much of that evil would have been prevented. It was very desirable, therefore, that Parliament should arrest the further growth of that pollution of rivers until it could adopt some general scheme for each drainage area. They did not want, by the present bill, to lay down, or even to hint, that those who were now polluting rivers were at liberty to go on doing so for ever. On the contrary, that was only a necessarily imperfect portion of a scheme, and they did not wish that any minister who might in future take up that question should be told that it had been previously all settled, and that he must meet the claims of vested interests. As a matter of English, he despaired of being able to define a stream, and, therefore, he thought it better to say that no stream should be included in the bill which was not *eo nomine* proclaimed for that purpose by the Local Government Board. That would afford a security that the measure would not be applied for frivolous ends or objects of annoyance. He thought the county court was capable of dealing with questions as to sewage, and he proposed to insert a clause giving an appeal to the superior courts at Westminster. These were the chief points as to which it had been necessary to change the measure. He trusted that those provisions, or some of them, at least, might be fortunate enough to obtain the assent of Parliament this year, for he felt certain that any diminution of the present evil, however small, would be beneficial to the public.

Lord ABERDARE saw no reason why they should not adopt the suggestion of the noble marquis, so far as dealing with solid matter was concerned; and he therefore heartily supported him on that part of the bill. But when they came to the question of sewage, he saw not only difficulty, but formidable objection to what was now proposed. He did not think the subject was one with which it was impossible for Government to deal, but he believed it to be necessary to secure the co-operation of the local authorities and the manufacturers. A comprehensive scheme which would be acceptable to all parties might be introduced next session. As to the present bill, he found it, even with the proposed amendments, open to many objections.

Lord SELBORNE disapproved the proposal to cast upon the county courts the duty of adjudicating upon sewage cases, which did not come within the proper business of these courts, and could not, in his opinion, be effectually dealt with by them.

The LORD CHANCELLOR remarked that the objection of the noble and learned lord was one which had led to the amendment of the bill, and that in its amended form it would probably be found satisfactory in the respect referred to.

Earl GRANVILLE thought the noble marquis had done right in giving up the attempt to pass the bill in its original shape through both Houses of Parliament, and he suggested that before the measure was reprinted the amendments should be carefully reconsidered, in order that the passing of it by that House might not be followed—as was sometimes the case—by abandonment immediately afterwards in another place.

The MARQUIS of SALISBURY, in answer to the Duke of Cleveland, said it was proposed that no sewage offence should arise under the bill till after the end of 1876.

The House then went into committee on the bill *pro formâ*, and the bill was recommitted for Thursday, July 1.

FRIDAY, JUNE 25.

The Weardale and Shildon Water Bill was reported, without amendment.

The Oldham Corporation Water Bill was reported, with amendments.

The Busby Water, Hamilton Water, Kilmarnock Water, and Alford Gas Bills were read the third time, and passed.

GAS AND WATER ORDERS CONFIRMATION BILL.—This bill was read the third time, and passed, and sent to the Commons.

Petitions in favour of the Birmingham Corporation Water Bill were presented from inhabitants of Birmingham, Aston, and Handsworth.

HOUSE OF COMMONS.

TUESDAY, JUNE 22, 1875.

The Barrow-in-Furness Corporation Bill (Lords) was read the first time, and referred to the examiners.

WEDNESDAY, JUNE 23.

The South Staffordshire Water Bill (Lords) was read a second time, and committed.

Petitions against the Barrow-in-Furness Corporation Bill (Lords) were presented from (1) Dalton-in-Furness District Local Board, (2) Landowners and ratepayers of Yarlside.

THURSDAY, JUNE 24.

A petition against the South Staffordshire Water Bill (Lords) was presented from the Corporation of Dudley.

FRIDAY, JUNE 25.

The Lords amendments to the Chelsea Water Bill were agreed to.

METROPOLIS WATER SUPPLY AND FIRE PREVENTION BILL.—The second reading of this bill was deferred till Friday, July 2.

Petitions against alterations in the South Staffordshire Water Bill (Lords) were presented from (1) Lower Sedgley Local Board of Health, (2) Tipton Local Board of Health.

HOUSE OF COMMONS COMMITTEES.

WEDNESDAY, JUNE 9.

(*Before the Right Hon.* W. E. FORSTER, *Chairman*; *Mr.* S. B. BRISTOWE, *Mr.* J. G. TALBOT, *Mr.* T. BRASSEY, *and Mr.* H. BIRLEY.)

METROPOLIS GAS COMPANIES BILL.

(*Continued from page* 934.)

Mr. *G. W. Stevenson*, examined by Mr. CRIPPS.

I have been in practice as an engineer for 30 years, and have had large experience in the construction and management of gas-works. I have been engaged in the inquiries which have taken place in Parliament and before the commissioners, affecting the supply of gas to the metropolis, since 1860. At the time of the inquiry, which resulted in the Act of 1868, there were three companies supplying the City of London—the Great Central, the City of London, and the Chartered. After that Act the Chartered absorbed the Great Central and the City of London, and then became the sole company supplying the City. In 1871 they further absorbed the Equitable, and in 1872 the Western. In 1866 the London Gas Company applied to Parliament for power to raise money, and the chairman of the committee—the Duke of Buckingham—said he did not like to alter the general legislation of 1860, but he said that in case four or more metropolitan companies came to Parliament and had the illuminating power, or price, or purity, or pressure of the gas altered, then the London Gas Company should be subject to the average of those four companies. The way in which the Chartered Company was placed under the regulations of the City of London Gas Act was by a clause which made them subject to all the provisions of the latter Act, which had been passed separately. In supplying all their district outside the City, they were made subject to the same regulations they were under in supplying the City. In 1869 the Imperial and South Metropolitan Companies both applied to Parliament for power to raise money. The question was considered whether they should be subject entirely or in part to the same provisions as the Chartered, the result being that they were made subject to those provisions, with the exception that their gas should be 14-candle instead of 16-candle, and, so far as the Imperial were concerned, that they might have a reserve-fund of a certain amount. The South Metropolitan Company's maximum price was fixed at 3s. 6d., and the Imperial at 3s. 9d. The South Metropolitan were also allowed to have an insurance-fund, but no reserve-fund besides. They had a certain amount of reserve-fund available at the time they applied to Parliament, and they were only authorized to continue it as a reserve-fund till it was reduced to £20,000, when it was to become an insurance-fund. The Imperial had a reserve-fund, which they might always keep up to the amount of £80,000. In 1872 the Chartered Company obtained power to raise a further capital of £1,000,000, upon which there was the same guarantee, by the machinery of the commissioners, for their being secured 10 per cent., as there had been with reference to their old capital. There was an option to make it 5 per cent. preference stock for five years, after which the shareholders could elect to have it made ordinary stock at 10 per cent.

By the CHAIRMAN: Under the City of London Gas Act, 1868, if the company anticipate that they will not be able to earn their maximum dividend in any year, they may, in the month of January, apply to have their selling price of gas revised, so as to enable them to earn their maximum dividend of 7 or 10 per cent.; and that, I consider, a practical guarantee.

Examination resumed: There are five companies still under the legislation of 1860—the Phœnix, the Commercial, the Ratcliff, the Independent, and the Surrey Consumers. These companies are answerable to and controlled by the Home Office, the other three companies being answerable to and controlled by the Board of Trade. The illuminating power of the gas of the five companies still under the old Act, is only 12 sperm candles, as measured by the burner prescribed by the Act. The others are bound to supply 14 candles, measured by the burner prescribed by the referees at a later date, and which may be changed from time to time by the referees. As to the burners, there is the one prescribed by the Act of 1860; then there is an intermediate burner; and then there is the one in use at the present time. Comparing the intermediate burner with the one in use in 1860, it would give two candles greater illuminating power for the same gas. The burner now in use would give a further two candles, or four candles altogether, above the value of the gas as determined by the burner of 1860. This bill which we propose would make no difference in the arrangement as regards the Chartered Company, neither in theory nor in fact, but it would adopt the legislation for the Chartered Company of 1868, for the whole metropolis. The Chartered and the South Metropolitan Companies are entitled to 10 per cent. dividend upon all their capital of 1868 and since; but the Imperial Company, though it applied to Parliament in 1869, is only entitled to 7 per cent. dividend upon its new capital. I consider that to leave any of the companies under the legislation of 1860 would be to leave them under legislation which may be said now to be obsolete. I do not think there should be any difference between the companies supplying gas in the metropolis, either as to price or illuminating power. There are no revision clauses applicable to the companies still under the Act of 1860. In my opinion those revision clauses secure a certain profit to traders, free from all the ordinary risks of a trading company, especially where that security is given them, irrespective of what has been done by them in former years. I look upon it as a premium on extravagance. There is no inducement left to them to do anything better than what will produce the 10 per cent. dividend; but on the other hand there is direct inducement to invest as much capital as possible in order to get that dividend. I think they would be more than human if they did not do it, and it is not desirable that that inducement should be allowed to continue. The Chartered Company applied for power to invest money in coal mines and in steam colliers; the coal mines were absolutely prohibited by Parliament, and the steam colliers were disallowed the first year, but subsequently the company were allowed to invest a limited sum in those vessels. It might be an advantageous speculation or it might

not, but certainly they would be secured from loss in any case. If the matter turned out unfortunate, the consumers might suffer, but the company would still have their 10 per cent., assuming it could not be shown that something was done by them out of the rule of due care and management. At all events there was a margin of uncertainty, which appeared to Parliament to be outside the operations of a gas company.

Serjeant SARGOOD: We do not get 10 per cent. on our ships, and we never asked to speculate in coal mines; our shareholders disapproved of the idea.

Witness: I believe the mines clauses were struck out before the bill went to committee; but they were in the bill as originally deposited.

Serjeant SARGOOD: It was not new capital; it was only asking for leave to apply existing capital.

Examination resumed: Supposing other matters were equal, the difference between the selling price of the gas supplied by the various companies would be regulated by the authorized amount they required for dividend, which would depend mainly on the amount of their capital and also on the amount of dividend they might divide upon it. The question of capital does not affect the prime cost of gas in the slightest degree, but it affects the selling price in the ratio of the amount of capital invested to the amount of business done; and it is obvious, other things being equal, that the company with the smallest capital for the amount of business done can afford to sell gas at the lowest rate. I have a table here showing comparative capitals, &c., of the metropolitan gas companies in 1873 and 1874, and the amount required for dividend as between the different companies. [The table was handed in.] The object of the table is to show how much out of the money received for each 1000 feet of gas sold would go for the purpose of paying the dividend in each case to each company. The Chartered Company, supposing all their capital was at 10 per cent., would require 1s. 10·8d. per 1000 feet sold to pay their dividend; the Commercial require 1s. 1d., and the South Metropolitan 11½d. It can thus be seen in a moment how important the question is. The inquiry therefore resolves itself into what is left of the 3s. 9d. after the 1s. 10d. is taken out of it. The commissioners, however, excluded the question of capital altogether; they considered that they were not entitled to go into it, though we say it forms a very important element in the selling price of gas. They could only deal with whatever it cost the company to make the gas and to distribute it, quite irrespective of dividend. When a gas company apply to Parliament for an additional amount of capital they may be constructing works at the time, but the capital is given to them, generally speaking, so as to carry them over 10 years, the supposition being that the expenditure would be doubled in that time. There are disturbing elements in special cases. Some companies have doubled their capital in two years, and doubled it again in two more, but the general rule is 10 or 12 years. What they ask for is based on an estimate which they themselves have the power of forming, and which they lay before Parliament, of the probable future expenses. There is, however, nothing to prevent the companies calling up the whole of the capital at once; and if they thought that at the beginning of any year they could not pay 10 per cent. upon it, they might call upon the commissioners to give them 10 per cent. consistently with due care and management. There is a little difference in these companies Acts. The Chartered Company's Act entitles them to a price which would pay a maximum dividend upon all the capital actually expended as well as called up; in the Imperial the words are simply "called up."

By the CHAIRMAN: I think that makes a practical difference in the result, because the company might keep a large floating balance of capital upon which they would be entitled to their 10 per cent. dividend. I do not think the balance in the bank should be considered as capital expended, I quite admit the propriety of a company being entitled to dividend upon floating capital, but that floating capital should be share capital.

Examination resumed: Usually the required working capital of a gas company is one-third of the annual expenditure. I think 3s. 9d. for 16-candle gas in the metropolis is sufficient to enable the companies, with moderate capital, and in a normal state of things to divide their maximum dividends, and it is enough to enable the Chartered Company, which has the largest amount of capital, in a normal state of things, to divide 10 per cent. In fact, it is more than some of the companies are charging; the South Metropolitan, for instance, only charged 3s. throughout the whole of the coal panic.

By the CHAIRMAN: The Chartered and the Imperial Companies do practically give the same illuminating power, but one is 14 candles maximum and the other 16, if they choose to take advantage of it, which they do not. The Imperial Company actually supply 16-candle gas as measured by the burner by which the Chartered Company's gas is measured.

By Mr. BRISTOWE: Suzg's "London" Argand burner would not fall within the definition in section 25 of the Act of 1860; that burner has 24 holes, and has not a 7-inch chimney.

Examination resumed: The South Metropolitan only charged 3s. during the time of the coal famine, because they had a reserve-fund which enabled them to tide over that time. Supposing they had not had the fund, or any fund of that kind to resort to, they must have charged 3s. 2½d. in order to have divided 10 per cent. In 1873 the Independent charged 3s. 2d. up to Midsummer and 3s. 6d. afterwards. The Rateliff charged 3s. 9d. during the whole of the panic, and paid their maximum dividend of £9 6s. 4d. The Commercial charged 4s. throughout, but I think they are now charging 3s. 9d., and paid 10 per cent. upon the whole of their capital. It was only those companies which had capitals in excess of the others that had to resort to the commissioners to obtain an increase in price. After setting apart so much out of the price for the payment of dividend, the remainder, if the price charged be 3s. 9d., ought to cover all the ordinary expenses of manufacture, and I find it does so from Mr. Field's books which I have here. In 1871 the total cost of coals and working expenses (which include everything except dividend) for the South Metropolitan Company was 1s. 11½d. Then taking the Chartered Company, which has the largest capital, 1s. 5½d. or 1s. 5⅝d. is required to pay their dividend; but knock off a third of a penny in the cost, and call it 1s. 6d. for dividend and interest, and we have 3s. 5d. for the selling price of gas, and 4d. to carry to the reserve-fund. That is assuming that they worked as cheaply as the South Metropolitan, and sold as much gas per ton of coal. In connexion with that you must refer to the cost of coal, which in 1871 was 14s. 1¾d. a ton. The Chartered have contracted, as we have heard, for a supply at 14s. 6d. The difference between those two prices would only make one halfpenny per 1000 feet difference. That does not include cannel gas, with which the whole of the Western district is now supplied. In 1872 the cost of coal to the South Metropolitan was 16s. 7d., which is considerably higher than the Chartered Company have contracted for for the coming year. The cost of coals, less residuals, together with all the working expenses, comes out at 2s. 0·15d. per 1000; and taking the 2s. and the 1s. 6d. they still require for dividend, we have 3s. 6d. The Chartered Company, with their facilities, ought to sell a larger quantity of gas per ton of coal carbonized than the South Metropolitan, and if they do not, it is want of due care and management. In 1873 the value of coke was unduly high, and that left a margin of 3d. to carry to the reserve-fund.

By the CHAIRMAN: It would give them their maximum dividend, and interest upon loans, and 3d. besides; 1d. per 1000 feet on the sale of the Chartered Company is equal to £17,000 a year.

Examination resumed: Considering the quantity of gas that can be sold and is sold by any company in the metropolis, and the population they have to supply, I consider 3s. 9d. quite a sufficient price to enable them all to divide 10 per cent., except in abnormal years.

THURSDAY, JUNE 10

The CHAIRMAN said that, with regard to any witnesses whom the committee might wish to call—especially alluding to one of the commissioners—they were of opinion that both the promoters and the opponents should thoroughly state their cases before these witnesses were called.

Mr. *G. W. Stevenson* recalled, and further examined by Mr. CRIPPS.

It does not, as a fact, require any considerable quantity of cannel coal for the purpose of making 16-candle gas. Taking the Chartered Company's returns for last year, I find that from the Blackfriars station the engineer supplied 16-candle gas all over the district, using only 2½ per cent. of cannel. We also have it in evidence from Mr. Livesey that he, practically, does not use cannel coal at all. He did use, I think, 300 tons of cannel, or something of that kind, during last year, and he maintained a supply of 16½ candles in his district, which is a very scattered one, throughout the year.

By the CHAIRMAN: The illuminating power in the Blackfriars district was quite equal to that in the other districts; the company did not come under any penalty. We have shown that at Beckton the gas is above 16 candles, and, if this is a fact, then the official testing would show above 16 candles, as compared with other places.

Examination resumed: The quantity of cannel used, in proportion to common coal, at the different stations of the Chartered Company, varies from 11·2 to 0·12, the average of the whole being 5·24. In making the average, Kensal Green is excluded. A per centage of 2½ of cannel coal, as at Blackfriars, would increase the price of gas a fraction over 1d. per 1000 feet; but, taking the average of the whole, and supposing it to be 5 per cent. of cannel, the increase would be under 1d. There is, in the proposed bill, a provision that there shall be no higher rate than 3s. 9d., and also one to diminish the dividend if the company charge a higher rate. The penalty imposed upon the companies for every penny they may ask, as an increased charge for the gas, is 5s. In the Act regulating the supply of gas to Sheffield in 1866, it is prescribed that an increasing dividend is to make a reducing price.

By Sir E. BECKETT: The 10th section of the Sheffield Gas Act prescribes the rate of dividend to be 7 per cent., so long as the price does not exceed 3s. 3d. per 1000, 9 per cent. when it does not exceed 3s., and 10 per cent. when the price is at or under 2s. 9d. per 1000. Then there is the West Ham Act, passed in 1869, the 11th section of which prescribes the dividends as follows:—7½ per cent. so long as the price shall be 4s. 6d., 8 per cent when it did not exceed 4s. 3d., 9 per cent. when not exceeding 4s., and 10 per cent. when not exceeding 3s. 9d. per 1000 feet.

Examination resumed: The Sheffield Company are able to make gas very cheaply; they have a large demand for coke, which is required for brazing. I do not think they have ever gone so low as 2s. 9d. in Sheffield. The effect of those clauses is that, if anything abnormal occurs, the loss is divided between the maker and the consumer, and there is a direct inducement to the vendor to make the selling price as low as possible. There is a prescribed illuminating power and purity in each case. In West Ham the company are regulated by a previous Act. Speaking from memory, I think the illuminating power at Sheffield is 15 candles. I have heard what has been said about 16-candle gas by the modern gas-makers, and I agree with the chemists who have been called in saying it is the same as the 12-candle gas supplied by the Chartered in 1860. I should like also to state that the penalty which the companies would have to pay, under this particular Act, would be nothing like the amount which they would otherwise pay. For instance, they make a profit of £52,000, but they would suffer a diminution of 15s. per cent., which would only be equal to £23,000 out of £240,000, whereas they would reap a benefit of £52,000. In other words, the company would reap a revenue equal to double that which they would have to give up in the shape of dividends. I concur with what Mr. Heisch and other witnesses have said, but they do not show how a 15-candle burner, as prescribed by the Act of 1860, may be made to assimilate to the burner prescribed by the referees under the Act of 1868. This [producing a burner] is the one in use at the passing of the Act of 1868, and this [producing another] is an Argand burner, suitable for 14-candle gas; it is a very costly thing, and is called Sugg's burner. Having once measured the gas, and taken care that a particular quality of gas is supplied for a particular purpose, it is a matter for the consumer to deal with; he may use any burner he pleases. There are flat-flame burners, which give an illuminating power approximating very nearly, indeed, to the test-burner fixed by the referees. Previous to 1870 attention was not particularly called to this question of illuminating power, but, since that time, special prescriptions have been inserted in Acts of Parliament. My experience shows that the illuminating power of the gas can be changed very quickly; indeed, I will undertake to change the illuminating power from Beckton to the first testing station, at 1000 yards distance, to the extent of two candles in 20 minutes. I was concerned in a large series of experiments which were made, I think, in the year 1855 at Uxbridge, as to whether the illuminating power could be changed from the works to the town, and I gave evidence upon it on the Birmingham Gas Bill. The experiments were officially made for the purpose, and I have also done it in my own practice. I was conversant with the particular experiment mentioned by Mr. Hedley in his evidence in 1866. He stated:—"I was called for the Birmingham Corporation, and I then proved that, in a quarter of an hour, the gas might be altered for five or six miles. I know that it is disputed by Mr. Hawksley, Mr. Barlow, and Dr. Letheby; but, about two or three months ago, Dr. Letheby was sent for to test my gas at Uxbridge. It was a good opportunity, I thought, to convince him, and, whilst he was on the works, I converted 12-candle gas into nearly 15-candle gas in less than a quarter of an hour." Mr. Hedley was then asked, "Did you inform Dr. Letheby of the process you were doing it by?" to which he replied:—"Immediately Dr. Letheby discovered by the photometer that the gas had risen in quality, I suggested to him that he should examine my three gasholders, with the valves leading to those holders, and the valves leading out into the town, and have them all opened. I was not making gas exclusively for him, but the town was receiving the gas which he was then testing."

The CHAIRMAN said it would be interesting to know if Dr. Letheby was convinced.

Mr. CRIPPS said Dr. Letheby did not interfere and say he was convinced.

Examination continued: The testings, as arranged in the bill, are to be average testings of the day; and the day, as prescribed, is from nine one morning till nine the following morning. I believe that was so under the Act of 1860, and we are reverting to that Act, the object being to secure a tolerably uniform illuminating power throughout the whole 24 hours. A very large portion of gas is consumed in the City in the daytime, especially in cellars and warehouses. If the gas was used only in the day for heating purposes, and at night for illuminating purposes, I could understand varying the quality in the daytime and at night, but London is quite exceptional as regards gas. I have never heard it put forward until to-day that the companies could legally supply a lower quality of gas. On the contrary, when the companies have applied for a revision of price they have always claimed a sum which would enable them to supply the whole bulk of 16-candle gas; but by the Act of 1868 the test of the whole bulk is confined to three or four testings. I think it desirable that the officer, on the part of the corporation and the Metropolitan Board, should have reasonable access to the books of the companies; it might be limited, perhaps, to one month before making up the accounts, so that the parties should not be taken by surprise. The companies are bound to present their accounts to the Board of Trade; and I think it is not unreasonable that the consumers, or somebody on their behalf, should have access to the books. I am sure such access would not be improperly used.

By the CHAIRMAN: With regard to the postscript to Mr. Farrer's letter, referring to the sale of shares by auction, I know that in many towns of the provinces the gas companies are compelled, by their several Acts, to offer all new shares to the public. I have prepared a list of the towns.

The following paper was handed in:—

Precedents for the Raising of New Capital by the Sale of Shares at Public Auction.

The following are some, among others, of the Acts in which it is compulsory upon the companies to raise new capital by auction:—

Name.	Date.	Section.	Remarks.
Nottingham	1853	22 and 23	All to be sold by auction.
Ditto.	1858	6 and 7	Ditto.
Scarborough	1859	3	Ditto.
Swansea	1861	24	Ditto.
Sowerby Bridge	1861	24	Half by auction.
Portsea Island	1861	6 and 7	Ditto.
Reading	1862	52	All by auction.
Harrogate	1863	22	Ditto.
Yarmouth	1863	24	Ditto.
Hertford	1864	23 and 24	Ditto.
Salisbury	1864	27 and 28	Ditto.
Chesterfield	1865	6	Ditto.
Exeter	1865	30 and 31	Half by auction.
Fareham	1865	20 and 23	All by auction.
Brighton and Hove.	1866	11 and 12	Ditto.
Reading	1870	7	Ditto.
St. Helen's	1870	11	Ditto.
Shipley	1870	11	Ditto.
Thirsk	1871	27	Ditto.
Whitby	1871	28	Ditto.
Bristol	1873	8	Ditto.
Nottingham	1873	13	Ditto.
Neath	1873	12	Ditto.
Newcastle-on-Tyne	1873	10	Ditto.
Colchester	1875	—	Ditto.

Sir E. BECKETT said he was sorry to object, but he thought they should have the Act of Parliament.

Witness said he would produce the Acts, or, at least, some of them.

By the CHAIRMAN: The 11th section of the Brighton and Hove Gas Company's Act, 1866, stated that "The company shall put up for sale by public auction in lots, of not more than two shares each lot, one-half of the shares hereby authorized to be issued,"—the compulsory sale is limited to half, and that is a mistake in my table—"provided always that the reserved price for any share at any such sale by auction shall not be less than the nominal value of the share; and any shares which may not be sold at any such auction may be allotted to such parties as from time to time the directors think fit, at a price not less than the nominal value of the share." The next section recites that "The intention to sell such shares by auction shall be advertised for two successive weeks in two newspapers published in the borough of Brighton, and any sum of money which shall arise from any such sale by way of premium, shall not be considered as profits of the company, but shall be carried to, and form part of, the reserved fund of the company." These clauses vary a little in some cases; the premiums are carried to the capital expenditure, but do not bear dividend, by which mode the capital is kept down, and that is the mode in which I should suggest individually that the new capital in the metropolis should be treated. The result of my experience is, that by the company not allotting to their shareholders the shares at the nominal price, but selling them in the general market—say a share in the Chartered Company, which I am told is now £180, as against £100—it would enable them to do with a less application of capital than otherwise. In the case of Nottingham, the company voluntarily offered their shares by auction in the year 1844 or 1845; in 1849 they introduced a bill making it compulsory upon them to sell shares by auction; they applied to Parliament in 1853, and again in 1858, and the same provisions were introduced; and in 1873 they came again, and sought to alter those provisions, and to revert to the general Act, but Parliament insisted upon the old legislation being continued. The consequence is that at the present time a very large sum of money has been carried to the capital account, in the case of Nottingham, which cannot bear dividend; I suppose it is from £60,000 to £80,000. The effect of that is that 8d. per 1000 cubic feet pays the dividend. The limitation in their Act, as regards dividend, was 5½ per cent.; but I should state that their £25 shares, carrying 10 per cent. dividend, had been previously changed into £50 shares, carrying 5 per cent. dividend, so that the public investing their money had about 4½ per cent. There was no provision in the special Act saying that if the dividend exceeded a certain sum, the price should be reduced; but if the profits exceeded the maximum, the price of the gas would have to be reduced. Subsequently to 1873 the gas undertaking at Nottingham passed into the hands of the corporation. The Bristol Gaslight Company's Act of 1873 contains a provision that "the shares shall, in the first instance, be offered for sale by public auction in the county of Bristol, after not less than 14 days notice of such sale advertised once in not less than two papers published in the said city, and any premium paid for such shares shall be applicable to the general purposes to which the capital of the company is properly applicable, but shall not be entitled to a dividend;" and that is the proposal I individually approve of. The Metropolitan Board do not support this proposition; but I do not represent that board.

Cross-examined by Sir E. BECKETT: The Nottingham Corporation contended that what had been done voluntarily in 1844, and again in 1848, should be continued in subsequent Acts, but there was no bargain at all. I do not know anything about Nottingham water. I have never known a gas Act in which the opponents have sought to get the auction clauses and have failed. There was a contest in Brighton in 1866, when the new company obtained their bill, but could not get their land, because they did not seek for compulsory powers, and the intending investors could not give a title. I was the engineer, so far as any one can be called engineer of an abortive company. I do not know whether at that time the old Brighton and Hove Company agreed voluntarily to sell half their shares by auction, or whether it was put upon them by force. I do not know of any company except the Nottingham Company, which have ever volunteered these auction clauses. They were imposed on Shipley after a fight; also on Thirsk and Whitby, and I think on Neath. They were also imposed on Colchester this year. The company assented to their being put in, saying they would not fight the question, as the corporation had petitioned they might be introduced. I am quite certain that the company at Thirsk did not assent to those clauses, for I appeared for the petitioners against the bill. People assent when they cannot help themselves, but that is a curious mode of assenting. There was a very heavy fight at Exeter, where half the shares were to be sold by auction. The Yarmouth case was also contested, but I cannot remember that case exactly.

By the CHAIRMAN: I am not prepared to say there has been any opinion of the Metropolitan Board against the proposition.

Cross-examination resumed: The companies which have been compelled to reduce their price, which for the time being was charged, were the Chartered, the Great Central, the City of London, the Equitable, and the Western. I do not think the Metropolitan Board want to adopt the Act of 1868 for the whole of the metropolis, because they are promoting a bill which is in many respects very different from that Act. We want to exclude that which we have found to be inoperative in the interests of the consumers. We are accepting the legislation of 1868 by incorporating a good many of its provisions, but not the whole of them, and we are giving to the companies something which the Act of 1868 does not authorize—viz., a reserve-fund to enable them to tide over a bad year without revision, which we do by the clauses 48A and 48B.

Sir E. BECKETT: What is to happen if a company is shown to have no funds? Neither the South Metropolitan nor the Chartered have any.

Witness: The South Metropolitan are actually earning more than they require for their dividend at the present time. After a time it is contemplated that the reserve-fund of the South Metropolitan may cease, and then they can immediately go to the deficiency-fund.

Sir E. BECKETT: Supposing there is no reserve-fund at all, then the words "if any" come in, I suppose?

Witness: Yes; and then the companies begin to make a reserve-fund.

Sir E. BECKETT: Excuse me; the clause does not authorize anything of that sort.

Witness: Then it ought to do so. I do not profess to draw a clause, but that is my intention.

The CHAIRMAN: Do not the next words do it?

Sir E. BECKETT: However, the promoters have admitted that it wants altering. Clause 48A goes on to say, "And the reserve or reserved funds (if any) of each gas company, and the sums from time to time invested under this section shall form a fund to be called the dividend deficiency-fund."

The CHAIRMAN: The words, "and the sums from time to time invested," seem to imply that there may be no fund, notwithstanding that the intention is to incorporate one out of the funds of the company.

Cross-examination resumed: I presume the intention of calling this fund a dividend deficiency-fund is to define it more clearly, because a reserve-fund may be applied to a great many purposes, and I think it far better to specify the purpose for which it is to be used.

Sir E. BECKETT: Supposing a company have been obliged to raise their price 1d. above the 3s. 9d., how are they to get any benefit whatever from this clause 48A?

Witness: In that year they would not, I presume, get any benefit.

Sir E. BECKETT: Supposing they had one or two such years, and that the whole of their dividend deficiency-fund has been exhausted, how are they to get anything if there is a third bad year?

Witness: We never have had any experience of such a state of things.

Sir E. BECKETT: Supposing they should have two bad years, how can they get anything if there is a third bad year, and if the deficiency-fund is exhausted?

Witness: If they have three bad years running, so as to exhaust the whole of the dividend deficiency-fund, they would not have anything for the fourth year.

Sir E. BECKETT: If for two years running they lost 2½ per cent. of dividend, the dividend deficiency-fund would be entirely gone, and if there came a third bad year it is plain they could get no sort of recoupment?

Witness: Yes; if they were relying entirely upon the reserve.

Cross-examination continued: We have had two abnormal years with regard to coal, 1873 and 1874; within the memory of man, coal has never attained any such price as in those two years. Labour was also very high, but it has gone down. Residuals do not always rise with the coal, but sometimes they do. The rise in coal affects the price of gas more than the rise in labour.

Sir E. BECKETT: Supposing the committees of 1868 and 1869 had been persuaded by your people not to have allowed any revision, where would the companies have been in those two years?

Witness: They would have had to do as a vast number of provincial companies had—that is to say, suffer in their dividends. The metropolitan companies have been protected, whilst all the other companies have been left to their ordinary chances as traders. A great many of the provincial companies have been limited in price as close as the metropolitan companies. Parliament has always fixed the price in each special Act according to the circumstances of the company applying, having reference to the cost of coal, and so on, of that company. In many cases the provincial companies have been charging their maximum price. When the Brighton Company came to Parliament for a rise of price in 1873, it was not because they saw what was coming, but because they were suffering from the pinch. Their maximum price was 3s. 6d., and their prescribed illuminating power 14 candles by the Sugg-Letheby burner; and Parliament gave them 6d. additional price, and permitted them to use the referees burner. I have never agreed that the value of the difference of the burner at 14 candles is 3d. in the price of gas, because it is not. Raising the illuminating power in a few minutes is one of the commonest things in the manufacture of gas that a manager is acquainted with. If the illuminating power falls below what it ought to do, and the manager or yard foreman gets notice of it, he sets to work and draws some of the retorts, and charges them with cannel, and so increases the illuminating power; and, instead of delivering that gas into the holder and storing it, he will deliver it direct to the town, and simply let the surplus go into the holder. Under the Acts of 1868 and 1869, the limits of the time of testing are prescribed, and the referees fix the hours and give the companies notice, although they are not obliged to do so. During the period of testing the companies are entitled to have an officer present, but not to interfere in the testing. The public auditor has access to the books every year, but the local authorities say that is not sufficient. I do not think it is desirable that they should have their information filtered to them through the public auditor, but I think they should be able to go and get it themselves. The public auditor might not be willing to give it, and, if he did give it, second-hand information is not always best. When the commissioners are about to revise, they may call for any information they like, and the companies are subject to penalties if they do not give it; but the information would be as to what has been, not what is going on at the time. I will tell you the information I refer to. When a company enters into a contract for a large quantity of coal in February, the contract is to begin to be executed in the September following, and not to conclude till September in the next year, that is something the books would show with regard to the future, and would be very valuable information to obtain; and the local authorities ought to be able to get that sort of information quickly. The commissioners did not ask for that information, but the Metropolitan Board did; and, if the board had not asked for it, and laid the results of their inquiries before the commissioners, nothing would probably have been known about it. When it was discovered, it was too late to stop the contracts, but the commissioners did not allow the company what they asked for in respect of these contracts. When the Corporation of Bradford purchased the gas-works, the statutory dividends were extremely small, owing to the fact that the company had a very small share capital, only amounting to £56,000, at 10 per cent.; all the rest of the works had been constructed out of the profits made by the company upon the sale of gas, upon which they received no interest. I think the price given was over 60 years purchase.

Mr. MICHAEL: It was 28 years, with incidental advantages.

Witness: I believe it worked out to 60, or something of that kind.

Cross-examination resumed: In 1866 the Sheffield Company was an old existing company, and the practice usually is to give new capital to old companies at 7 per cent. The Sheffield Company were given an extra bonus up to 10 per cent. if they should be able hereafter to reduce their price; but, in the absence of knowledge of what their selling price was at the time, I cannot tell whether it was an advantage to them or not.

Cross-examined by Serjeant SARGOOD: We propose to put the burner authorized by the referees into the bill, and to call the gas 16-candle gas, although it is the same gas as formerly. If you like to let us adopt the burner that was in use in 1860, we will put 12 candles into the bill instead of 16. The burners have been improved in the process of manufacture to the extent of four candles since 1860, and therefore the figure 12 is done away with, and 16 is introduced to suit the present burner. If you have two photometers side by side, and you test precisely the same gas with the burner of 1860 and the burner of 1868, one will give you 12 candles and the other 16. There is a great difference in the present bill, as applied to the Chartered Company, to what the application of the 1868 Act is. I think uniformity is possible with regard to price and illuminating power just as much now as it was in 1860. The price, combined with the quality of gas sold, are the two factors out of which the companies obtain sufficient to pay the dividends, which, of course, as regards the lump sum required, will vary with every company according to the amount of capital. The companies might all be brought into a state of equality in regard to capital, and so the dividends of all might become uniform.

Serjeant SARGOOD: I want to see how uniformity of price fits itself into the idea that the most ancient company must have the largest amount of unproductive capital—capital dead and gone, and which no longer can produce anything, and yet has to be provided with its dividend.

Witness: I say it ought to be liquidated by a gradual process, and I hope the committee will deal with the matter. I admit that the oldest and the largest company—that is to say, the Chartered—has an enormous capital which long since has been worn out and ceased to be productive, and I think that the proportion of capital due to worn-out works ought not now to be bearing dividend. There we want further legislation; it ought to be liquidated by a sinking-fund. Dealing with things as they are, I admit that you cannot talk of equality of price at the present moment, though by future arrangements it might be worked out.

Serjeant SARGOOD: Looking upon the revision clauses as machinery for guaranteeing a maximum dividend, you say that up to 1868 Parliament had never suggested the propriety of guaranteeing a dividend to a company.

Witness: I did not say Parliament had never suggested it, but it had never been carried out. I think the obligations placed upon the companies were light compared to the privileges they enjoyed in connexion with those revision clauses. I know that the Chartered Company were entitled to raise £600,000 of new capital in order to go on with their business under the new arrangements of 1868, and that they have since been allowed to raise £1,000,000 of new capital on the same grounds; and most extraordinary legislation I say it is. I am not seeking to do anything, or suggesting that anything should be done, to destroy your rights under the Act of 1868 in regard to capital already raised and expended; but, with regard to all future capital, I think it should be raised on the most favourable terms, and that can only be done, I conceive, by offering the shares to the public, and letting them value and purchase them.

Serjeant SARGOOD: In the interest of the consumers you think that when Mr. Cardwell said to us, "Undertake these obligations and I will give you a certain dividend," and we do undertake them, and want a million to carry them out——

Mr. CRIPPS said that was not the case; that million pounds was given in a subsequent year altogether, and had nothing to do with the bargain with Lord Cardwell.

Serjeant SARGOOD said that the company went to Parliament in 1872 to raise £1,000,000 of money, which they required to carry out their engagements of 1868, and the committee thought they were entitled to the terms of 1868—viz., the guarantee.

Cross-examination resumed: I know that in carrying out the arrangement of 1868, the Chartered Company have amalgamated with those five other companies; and in compliance with the wishes of the public not to have the gas manufactured in the heart of the metropolis, they have built new works at Beckton. It was not the amalgamations which rendered those works necessary, because you are enlarging the Great Central works at Bow Common to compensate for those you have destroyed at Blackfriars, and you have the Equitable and Kensal Green works; it was rather the increasing consumption in gas, which is at the rate of nearly three million feet per day in mid-winter.

Serjeant SARGOOD: Parliament having authorized us to raise £1,000,000 at 10 per cent., of which half has been issued, as against the holders of that capital, do you think it fair to alter the regulations of 1868?

Witness: Yes; but, at the same time, I think those people who have subscribed their money on the faith of what I conceive to be amounting to a parliamentary guarantee, ought to be secured in their revenue; but with regard to unissued capital I would deal differently. Our sliding scale, which is to be substituted for the revision, does not contain anything specially saving the rights of those who are existing shareholders; but I think clauses 48A and 48B will secure them their maximum dividends.

Serjeant SARGOOD: I think I can show you that they will not. At present the reserve-fund has to be manufactured out of the surplus profits, after paying 10 per cent. dividend. Supposing during this year we only pay 8 per cent., we shall not have any reserve to go to; but supposing next year we are lucky, and make 12 per cent., and so put 2 per cent. into the reserve-fund after paying the dividend, do you mean us to make up the 2 per cent. of this year out of the reserve-fund?

Witness: No; but I will tell you what I would do, and what the promoters of this bill ought to be prepared to concede—that you should have such a price as would enable you to fill your reserve-fund as quickly as possible; and the sooner you get it full the better. With regard to the half million not yet raised, I would suggest that you should be required to put it up to public auction, and you would get £1,000,000; so that instead of issuing the £500,000, you would need only to issue £250,000, which would bear 10 per cent. interest. People would buy at £200 or £210, and that would keep down your capital, and be also buying in capital which does not carry any dividend at all. It would be an additional security to the larger amount of capital you have which does bear a high dividend. That £250,000 would come out of the pockets of the public.

Serjeant SARGOOD: Why are they to subscribe it for the benefit of the gas consumers?

Witness: Why should they not? Why should your company be a close borough?

Cross-examination continued: So far as I know, there are only those companies mentioned on the list who are compelled by Parliament to sell the whole or a portion of their shares by auction, and it is not likely that companies will volunteer to do it.

Serjeant SARGOOD: What was Parliament about, when, in 1845, it thought, if a trading company had been so successful that upon raising new capital its shares were found at a premium, that the shareholders were entitled to the advantage? Was that a sound or unsound principle?

Witness: I think it was very sound in this respect, that it prevented jobbery with the shares. To my mind, that obligation to distribute new shares, in proportion to the holdings of the original shareholders, was inserted in the company's Act to prevent that jobbery. I cannot tell what was in the mind of Parliament, but it has that effect. It allows the shareholder the advantage of having the premium on his share, if he chooses to dispose of it, or having 10 per cent. for his money if he prefers to put down the price of them at par.

Serjeant SARGOOD: Is not the effect this, that the moment a share goes on the market at a premium the holder ceases to get his 10 per cent., which you talk of as being guaranteed?

Witness: No; he gets 10 per cent. upon the £100, and he is willing to give more than that amount in order to get the £100 with a 10 per cent. dividend.

Serjeant SARGOOD: Is it not a farce to say that any of these shares issued at a premium in this way to the public any longer bear a 10 per cent. dividend?

Witness: They do bear a 10 per cent. dividend on the nominal value of the shares. If you like to go into competition with the public for shares, then you are one of the public, and not a shareholder. The aggregate capital invested in London gas is about £11,000,000; and the capital doubles itself in about 12 years; hence £22,000,000 of money will be invested 12 years hence, and is the required capital be competed for by the public, more than half will be saved to the consumers. Coal is not usually a fluctuating article; until the coal famine came in 1873, coals had been bought at the same price, within 2s. a ton, for many years. I object to the revision clauses, because they do not work in the interests of the consumers at all, and the commissioners were certainly not invested with the power they ought to have. I also say that the gentlemen who were appointed, not having special knowledge of the subject, and not knowing what was due care and management in gas-making and distributing, were scarcely qualified to give a decision. I think the revision was a capital machine for raising the price in the interests of the gas companies.

Serjeant SARGOOD: Supposing, instead of being up, everything had been down, was not the machinery unquestionably equally available for lowering the price in the interest of the consumers?

Witness: I doubt it very much, with the limited powers the commissioners were entrusted with.

Cross-examination continued: The money Parliament allowed the company for ships—£150,000—was a capital which, if not applied for that purpose, was capable of producing 10 per cent., but which was lowered to 7 per cent. the moment it was devoted to ships.

Serjeant SARGOOD: You made the observation—I do not know upon what authority—that it appeared to Parliament to be outside the operation of the Act. I do not know what you mean by that—it was our business to get coals brought to us as cheaply as we could.

Witness: You might not succeed in doing it, and it is well known that steam colliers have not been paying things of late. It was altogether a one-sided thing; it was "heads I win—tails you lose." If you succeeded in making a profit, you were limited to 7 per cent.; if a loss, the consumer had to bear it and not the company.

Cross-examined by Mr. VENABLES: I think 3s. 9d. is quite enough to enable the companies to create a reserve, but that might be tested very fairly by letting them work under that price for a year or two, and if it should be found that, by exercising due care and management, they are not able to create that reserve, then I think they should have a somewhat higher price to enable them to create it. I think 5 per cent. upon the capital is quite sufficient to form a reserve-fund. I hope we shall never again see two such years as 1873 and 1874. Supposing it had happened to be four years instead of two, the country would have been ruined—not gas shareholders only, but everybody. I was not aware that last year the Nottingham Water Company were released from their obligation to sell their shares by auction; so that now there is not a single water company in the kingdom with that obligation.

Mr. VENABLES: Supposing a company want to raise £50,000 or £100,000, does not the auction clause make it necessary to issue the whole of the capital represented by the shares at once?

Witness: No.

Mr. VENABLES: You cannot sell, I suppose, or cannot sell to advantage, the shares which are issued subject to calls?

Witness: No; whatever amount of money you require, you estimate how many shares will realize that sum if sold by public auction, and you offer them, and in that way you get the whole amount of money you want. I do not think that the prospect of future capital being raised at some premium or other enters into the calculation of one in ten thousand persons who buy shares.

Mr. VENABLES: Take the company I represent. Do you think that the purchasers in the Commercial Company have not been influenced in the prices they have given for their shares by the prospect of hereafter being able to invest their money at 7 or 10 per cent.?

Witness: No; on the contrary, if the new capital of these companies be sold by public auction, the old capital will be increased in value immediately, and realize a very considerably greater sum than it now does.

Mr. VENABLES: Supposing there had been one set of shares that were entitled to future allotments of capital at 10 per cent., and another set of shares which were entitled to no allotment at all, which do you think a shareholder would prefer?

Witness: I do not think it would influence the general shareholders at all. I should prefer those in which I should be entitled to further allotments.

Re-examined by Mr. CRIPPS: As an inducement for a party to go into an unknown matter, which might turn out something or nothing, it is not too much to say, "If you are successful you shall have 10 per cent;" but it is a totally different thing when a company has been established for years, and is found to be able to pay 10 per cent. With regard to the purchase of ships, I see that, by the Chartered Act of 1873, the company could divide 10 per cent. upon the £150,000, so long as they were charging 3s. 9d. per 1000, and the 7 per cent. would only apply when the price was more than 3s. 9d. Supposing 20 per cent. was lost upon that capital, the company would still receive 10 per cent., and the whole of the difference must come out of the pockets of the consumers.

Mr. CRIPPS: With reference to the capital which was obtained by the Chartered Company, under the Act of 1872, which was given for the purpose of carrying out the works at Beckton, those works were before Parliament in 1868, were they not?

Witness: Yes. An estimate had been formed of the expense of the Beckton works, and the money that was given them, under the Act of 1868, was given for the construction of a portion of those works. The first works the company constructed were for the supply of 10 million feet a day, but they have doubled that since. If the directors think it right to attach to the unissued shares a dividend of 10 per cent. they might do so, but there is nothing in the Act of Parliament to compel it to be done.

Mr. CRIPPS: You were asked about the abnormal price of coal and wages. Will you take these two books for 1869 and 1873 into your hand, and tell the committee what the total amount payable for wages would be as chargeable to 1000 cubic feet of gas?

Witness: The difference is very small indeed—a decimal point of a penny. The wages, under the head of manufacture, in 1869 averaged, for all the London companies, 4·86d., and in 1873 they averaged 4·98d. The Chartered Company's wages for 1874 amounted to 4·37d.; that is because they were making more gas. Under the head of distribution, the average cost for wages in 1869 was ·75d., and in 1873, ·67d.

Mr. CRIPPS: You were asked a question with reference to the London Gas Company, and I am not sure that you made the matter clear. Only three companies have been in Parliament since that clause in the London Gas Act was introduced, which declared that their illuminating power and their price should be regulated anew if any four companies came to Parliament; but one of those companies, after they were in Parliament, absorbed several of the other companies, and the question would be whether, having absorbed those companies, it is to be taken to be the same thing as if those several companies had been in Parliament?

Witness: For all practical purposes it is the same as if the Equitable Com-

pany had been in Parliament, and had introduced into its Act all those provisions that were introduced into the Chartered Company's Act.

Mr. CRIPPS: When the companies come to Parliament, whatever they ask for may be granted on certain conditions, or refused altogether; but, if it is intimated to them that the conditions upon which they get what they want are the acceptance of those clauses, it is not necessary for the committee to say absolutely, "You shall put in those clauses"?

Witness: No, and it is too bad to assume that, because a company do not withdraw their bill, they are assenting parties; that is virtually what is put to me, that because they accepted the bill, therefore they are assenting parties. In the cases I have mentioned, the introduction of those clauses was resisted, and fought to the bitter end; and the result would have been that if those clauses had not been accepted, the bills must have gone.

The CHAIRMAN: Do you not suppose that persons who have been buying shares of the Chartered Company since the Act of 1872 have done so with the notion that every share was bought under the conditions of that Act, and that unless the directors thought fit to issue at 5 per cent. what they had power to issue at 10 per cent.—which the shareholders might naturally expect they would not do—they would get their *pro ratâ* share of the half million unissued?

Witness: Those shareholders who know and understand these things would naturally look forward, in course of time, to having the other half million appropriated amongst them; but the great bulk of the shareholders do not look to that, and they have no real interest, at present, in the matter. I think it was a provision entirely without precedent. Putting aside the question as to whether there ought to be any interference with the half million which there is power to raise, but which is still unissued, I am of opinion that there ought to be no such provision with respect to further capital to be raised.

The CHAIRMAN: You used the term "guaranteed dividend" once or twice, and you said you thought the dividend guaranteed under the Act of 1868 ought not to be interfered with; how do you consider that that dividend was guaranteed?

Witness: By the revision clauses; by the power which the company have to apply in the month of January for such a price as will enable them to pay their maximum dividend.

The CHAIRMAN: Turning to the 68th clause, combined with the other clauses of the Act of 1868, am I not right in supposing it merely means that the commissioners are to give them an increase of price over 3s. 9d. if they cannot, with the exercise of due care and management, pay 10 per cent. dividend at 3s. 9d.

Witness: Yes, that is so.

The CHAIRMAN: We have had the evidence of the engineer of the South Metropolitan Company, and, putting aside the advantage which the consumer dealing with that company has in their not having to earn so much money out of their price for dividend as the other companies, it appeared from his evidence that the whole cost of producing gas was much smaller with the South Metropolitan than in the case of the Chartered Company. How do you account for that?

Witness: I cannot account for it at all, except in the way in which I sought to account for it before the Revision Commissioners, which is that the Chartered Company made some great mistakes in constructing their Beckton works; that they were not able to get their retorts heated to the proper standard; and that they failed to get the quantity out of the gas that they ought to have done. I will show how a well-worked company carries on its undertaking, and how an ill-worked company carries on its undertaking. I have extracted from the books the following:—"The Chartered Company in 1869 sold 8251 feet from every ton of coal carbonized; in 1870, 8154 feet; in 1871, 8118 feet; in 1872, when the company's Beckton works got into operation, they sold 7725 feet; in 1873 they improved a little, and sold 8060 feet; and in 1874 they sold 8816 feet from every ton of coal carbonized; so that it improved vastly in the last year. Take the Ratcliff Company—and this is what I call good management—in 1869 they sold 7506 feet from every ton of coal carbonized; in 1870, 8028 feet; in 1871, 8871 feet; in 1872, 9339 feet; in 1873, 9340 feet; and in 1874, 9430 feet.

Mr. BIRLEY: The quality of the coal has a great deal to do with the question, has it not?

Witness: One company has not the same opportunity as another company.

By the CHAIRMAN: In my opinion, the appointment of three gentlemen to give an increase of price, unless a want of due care and management can be proved, by no means fills the place of the stimulus that would exist to induce a manufacturer to exercise that due care and management if he suffered loss from the want of it.

The CHAIRMAN: As regards clause 48A, there is one point I do not quite understand. It says this excess of profit is to be put to the fund which you call a dividend deficiency-fund, which is practically the same as a reserve-fund; but is it to go on accumulating at compound interest until it reaches 5 per cent. of the paid-up capital, and is no part of the fund to be made use of to make up any deficiency in the dividend until it reaches that amount?

Witness: It may be drawn on from year to year before it reaches the 5 per cent.

The CHAIRMAN: I understand your 6th clause, with your clauses 48A and 48B, would have this meaning, that the company could never charge more than 3s. 9d. without suffering loss in their dividend. Did you give the proportion in which they would suffer loss compared with the additional price to the consumer?

Witness: It is about one-half. One penny increase would give the Chartered Company £17,000 odd; they would lose 5s. per cent. in their dividend, which would be equal to £7775, so that they would lose less than half. I dissent from the views expressed by the Board of Trade, that there has never yet been a precedent in parliamentary legislation for any trading company, authorized by Parliament, dividing more than 10 per cent., and I think it a great misfortune if such a precedent should be created in regard to gas in the metropolis. I like the provisions in the West Ham and Sheffield Acts far better than the proposals of the Board of Trade.

The CHAIRMAN: Comparing the Board of Trade's proposition with yours, it seems to me that it would be more to the interest of the vendors to get the price as low as possible by that proposition than it would be by your bill, because you hold out no inducement to the vendors to put the price below 3s. 9d.

Witness: No; there is no inducement to a further economy than would realize the statutory dividend. If the dividends are allowed to go both ways there is a direct inducement. By "statutory dividend" I mean the dividend prescribed by Parliament.

The CHAIRMAN: Turning to the point about the official hours for testing, you are of opinion that Mr. Heisch was wrong in interpreting the Act, that the company were merely required to furnish gas within the testing hours of the prescribed illuminating power?

Witness: I think he meant to say that the companies only rendered themselves liable to penalties if they did not supply gas of proper illuminating power within those hours, but I think the Chartered Company are under obligation to supply 16 candles minimum during the whole 24 hours. The difference of opinion upon that matter must entirely depend on the way in which the words, "subject to the provisions of this Act" in the 1868 Act are interpreted.

The CHAIRMAN: I think it is agreed on all sides that, unless it was discovered during the testing hours that there was not the illuminating power, the penalty attached in the Act would not apply. Does that imply that there could not be an action against the gas company for not giving the 16-candle gas during the day, as they appear to be required to give by section 53?

Witness: Any consumer would stand a very poor chance of recovering. In several towns in the country they give more than 16-candle gas, but that is in cannel districts. In my opinion 16 candles is as much as ought to be aimed at in London. I think that the consumers generally would rather get an advantage in price than in increased illuminating power.

This closed the case on behalf of the promoters.

FRIDAY, JUNE 11.

Sir E. BECKETT, said it now became his duty to open the case of the associated companies against this bill. They were the Imperial Company and the other companies who are under the Act of 1860, with the single exception of the Commercial Company; and the committee would understand that these companies were entirely opposed to the whole of the bill in its preamble and its clauses, although, of course, there were in this bill, as in every bill, some things which, though quite unnecessary, would be unobjectionable. His learned friend (Mr. Cripps) said that he appeared for the corporation and for the Metropolitan Board, who had no private advantage in the matter. Of course they had no private advantage, in one sense of the word, except so far as they might burn gas in their public or private capacity, but what was the whole of this contest about? It was merely to get gas sold at a rather lower price, and if that was not a private advantage he should like to know what else it was; it was for the private advantage of every consumer of gas. The gas consumers could not appear by themselves, and they appeared by these bodies, their object being to save a little money in the price of their gas and nothing else. The quality of the gas supplied was hardly in question here. His learned friends and their witnesses had stated that the real essence of the bill was the price clauses. He would not say that it was clause 6 after what the chairman had said about it, but there were some price clauses, and the promoters were only there to obtain a supply of gas at a price to be fixed by Parliament when everything else rises—*i.e.*, to make the price, as Mr. Stevenson admitted, in abnormal years the same as in normal years. To show the idea of the Metropolitan Board and of the corporation in promoting the bill, his learned friend said in his speech: "It is said that you have no right to make fresh regulations. But so long as there is a monopoly we have a right to introduce regulations for the purpose, which Parliament will sanction." What purpose? His learned friend did not define his purpose; but it was perfectly plain, from all that had been said throughout this case, that what he had already mentioned is the purpose. Now the best thing for the public, of course, would be that the companies should have no profit at all, and that they should be compelled to carry on their works at the smallest margin over the working expenses. If the statement of his learned friend meant anything at all, it meant that the promoters were entitled, according to their own views, to come to Parliament whenever they thought the terms given by Parliament to the gas companies were too good for them. Mr. Stevenson had already announced the coming crusade against capital. The next step would be that all capitals should be reduced to a minimum—the minimum of the South Metropolitan Company, for it was said that all other companies had wasted their money. The next step, he supposed, would be to have all the works in the metropolis valued. That is quite consistent with Mr. Stevenson's evidence and with his learned friend's opening. Then they said that the companies ought to have a sinking-fund, which, of course, was to be taken out of their dividends, and they were to write off the old capital; and the promoters would tell them that that had been done with the Manchester Corporation works. But how was it done? The Manchester Corporation in early days charged a good deal more for their gas than they need have done, and applied the profits to write off their capital, and consequently they now charged a very small price for their gas compared with other places where a dividend had to be paid upon capital. Mr. Stevenson would say that what the Manchester Corporation had done the companies ought to do. He (Sir E. Beckett) did not mean to say that the Manchester Corporation did it wrongly, but they charged in the early days a high price for gas, they having a margin in that way. That might be a judicious thing for corporations, but it was never allowed for companies, and in 1857 and 1858 it was asked for and refused. It must necessarily come to the condition which he stated just now, that the gas-works were to be carried on at the smallest possible margin above the working expenses. He accepted Mr. Stevenson with great satisfaction as a very valuable man, for this view was in accordance with the principle upon which the Metropolitan Board had promoted bills for some years. That was one great value of getting hold of witnesses like Mr. Stevenson, who was a clever and able man, and a person of great experience. And here he would make this remark, not against Mr. Stevenson personally, but against witnesses of that class. Mr. Stevenson had inherited the mantle of Mr. Samuel Hughes and of Mr. Patterson. Mr. Hughes helped the Metropolitan Board to pass the Act of 1860, and he appeared for the Metropolitan Board on several occasions. Unfortunately he and other people had departed, and Mr. Stevenson had come into his place; but there were always Hughes and Stevensons to be called, and these gentlemen were almost as impartial as counsel who, however, did not pretend to be more than advocates. If he (Sir E. Beckett) had been engaged on the other side, he would probably have said what Mr. Cripps said, and if Mr. Cripps had been engaged on his side he would have said what he said. Counsel were mere machines. The late Mr. Hope Scott compared them to cabs on a stand; but that perhaps was rather lowering their position. His learned friend (Mr. Cripps) said he hoped they were Hansom cabs.

The CHAIRMAN: Better that than "Crawlers."

Sir E. BECKETT said these experienced witnesses were almost as impartial as counsel, with this difference, that they did not pretend to be impartial; they always gave their evidence as if their firm conviction was that nothing could induce them to say anything upon the other side. In 1873, Mr. Stevenson came to ask Parliament, and with success, to raise the price of the Brighton Company, because they could not divide their dividends unless it was raised. He (Sir E. Beckett) was then for the corporation on the other side, and opposed it, and said what anybody else could say against it. Mr. Stevenson assumed all the facts he then stated to be absolutely true. No doubt they were true but everybody knew what witnesses of that class were, and that Mr. Stevenson came because it was necessary for him to represent the case for which he was hired for the time. Now the Brighton rise of price was the same in date as the application by the Chartered Company for the Board of Trade revision, against which Mr. Stevenson gave evidence. They had had their price fixed, under the impression that coals would never rise; but the facts stated by Mr. Stevenson were exactly the same as occurred in other instances, the facts being a rise in the price of coals and a rise in the price of labour. That showed the value of this kind of evidence. Besides a good witness and one who was independent, another thing which was wanted in a case of this kind was a maxim which would sound well. When people wanted to bring about a reform, they always began with a good-sounding maxim, and the maxim here was that in times of high prices the companies should share the loss with the consumers. That sounded extremely well, but it was new to him. In other words, the maxim of the Metropolitan Board, who represented the people of London, of whom 99 out of 100 were traders, was that when prices rose the sellers should share the loss with the consumers. These maxims must prove themselves by their results. What was the authority for that maxim? It was said that the company should share the loss with the consumers. The whole question was that there was a rise of 6d. or 9d. or 1s. in the price of gas. Taking it at 6d. per 1000 cubic feet, what did it amount to? It was a seventh or an eighth of the price charged by most of the companies. A very small proportion of any man's expenditure was his gas bill. In other

words, what proportion of any man's expenditure were they now fighting about? It was an extremely small proportion, and it was an utterly insignificant proportion as regarded anybody. But what was 6d. on the dividend of all the companies? Taking the figures which had been given, it would be seen that 6d. was nearly one-half of the total profit of all the companies! In 1869 and 1870 the profit was 1s. 4d. and a fraction; in 1871, it was 1s. 3d. and a very little over; in 1872, it was 1s. 1·46d.; and in 1873, it was 1s. 1·23d. If he had said they were fighting about 9d., of course it would be a still larger proportion. Of course there were other illustrations which might be given, but that probably was enough. They were fighting this battle over again after 1868, 1867, 1866, and 1860, about this utterly insignificant question to the consumer, but which was a vital question to the producer. The number of companies was now upwards of 1000, and in *The Times* of that morning it was stated that the gas capital invested was upwards of £130,000,000. It was so stated at a meeting of gas managers the other day, at which Mr. Livesey was present. Of course, nothing turned upon the accuracy of it. There were £11,000,000 of that capital invested in London. And he would like to know the difference between the metropolitan gas and the Birmingham or Liverpool gas, or any other place. If this maxim was to be applied to London, it must be applied everywhere where there was a company. The Metropolitan Board, if they were right in their contention, ought to have their example copied by every corporation and every public body throughout England. If it was fair to deal in this way with the gas property in London, it was equally fair to deal with it in the same way as regards every company in Great Britain. Had this sort of thing ever been attempted anywhere else? It had not; he ventured to say of his own knowledge, and he defied any one to contradict it, that there had never been such a bill as this brought forward in England. There had been purchase bills, which had always ended in leaving the gas shareholders in quite as good, or, perhaps, a better position as to dividend. The Bradford Corporation, a few years ago, attempted to bring in a bill to compulsorily buy the Bradford Gas-Works, and it was settled upon the terms of giving 38 years purchase, including the contingent advantages of the existing dividend. He was, therefore, surprised that Mr. Stevenson thought it worth while on the previous day to try and parade what the works cost, and a great deal more, because he, of all men, knew that the only thing with gas or water companies in buying their works was the value of the concern to them; not the money which had been spent upon the concern, but the money which could be got out of it. It seemed that in the Bradford case it amounted to 38 times the existing maximum dividend; sometimes it was 24 times the maximum dividend, and it went up to 38 times, as in that case. These are the terms upon which the gas companies had been dealt with over and over again, sometimes by agreement made before coming to Parliament, but generally when the bill was in Parliament; sometimes it had been by bills of their own, and sometimes by bills of the corporations. But in this case the Metropolitan Board sought to damage the property before they bought it. The committee knew the history of the present bill. The Board of Works brought in a purchase bill, No. 1, and bill No. 2, to establish competing works, and bill No. 3, which was the present bill, for regulating the existing companies. In speaking of the purchase of the undertakings of companies, his learned friend reminded him of the case of Nottingham last year, in which the corporation gave a half per cent. more in the shape of annuities than the maximum dividends which the company could divide. This was one of the more recent instances, but they might be counted by legions. In the early days of railways, coal was carried upon paying a small way-leave to the owner of the land; and when this way-leave became valuable, and it was attempted to do away with it, it was only done upon paying full compensation. So in the case of the telegraph companies. An attempt was made a few years ago to buy the telegraphs at the price fixed by the Government. What was the result of that? It ended, in the course of a few days, in the companies being purchased at 20 years value, not of their maximum dividend, but of their actual earnings, which he happened to know amounted to just double the price mentioned in the original bill, taking into account their prospective advantages. He did not know a case in the whole of the kingdom such as this. In the case of Glasgow, Leeds, Dundee, and in some smaller cases which did not just then occur to him, there were competing companies, and they both came to Parliament for extensions to meet the growing demands. He was consulted by one or two of those companies, and he said, "Before this case has gone on long you will be told that competition in gas is only a waste of money, that you must agree to sell your works; so that it is only a question of terms." That was so in every one case, when Parliament had attempted directly or indirectly to confiscate the property of a company, but he could recollect a case in which there had been an attempt like this. Sometimes there had been an ingenious device of rival works, but those rival works had been invariably rejected, because Parliament had another principle—namely, that they would never allow a corporation to enter into competition with a company; they would not allow public money to be used to defeat companies; and he defied anybody to point out a single instance to the contrary. He remembered a case where a bill of this kind was sought to be carried through Parliament by a sort of trick; he meant the case of the Maryport Company, but in the next year the powers which had been obtained the year before were altered. There could not be a stronger instance than that to prove his statement that neither directly nor indirectly had Parliament reduced the price of gas in that manner. When society got a little more communistic perhaps it might be so, but it had not got to that state of things yet. But if applied to gas companies the same doctrine should be applied to railways. There were 600 millions of capital invested in railways. What would be the best regulation for the public against railways? Of course it would be to reduce their fares as much as possible. Was there a uniformity of railway fares by Act of Parliament? Nothing of the kind, and Parliament had never attempted to equalise them. He would now take up his learned friend's history of metropolitan gas legislation, beginning with the year 1860. What was the nature of the legislation of that year? The preamble stated the advantages of districting both to the companies and to the public, and the discussion of the provisions of the bill, very soon slid into the question of what should be the regulation of the monopoly then first acceded to by Parliament, and never seceded from throughout Great Britain. The sole question was, what should be the protection, or what obligations were to be imposed upon the companies. Now, did that bear any parallel to this case? He would like to know what terms were proposed now, and he must refer to one of Mr. Newton's audacious answers, or rather his evasions. He (Sir E. Beckett) asked Mr. Newton to point out any single advantage which the gas companies got in 1860 besides competition or a regulated monopoly, and he had the audacity to say that they got back dividends. He knew that so far from getting their back dividends they were limited in the payment of them to six years, whereas such of the companies as were then under the Gas-Works Clauses Act, 1847, were entitled to make up all their deficient back dividends. The Act of 1860, therefore, so far from being a bonus, was an onus and a restriction; that he thought was practically conceded, but the main reason for the bill was that it was a benefit to everybody. Having obtained by that Act all the uniformity that was possible by legislation—*i.e.*, uniformity of machinery and uniformity of illuminating power (because uniformity of price and dividend was not possible while the companies were under different conditions)—who had been the disturbers of the arrangement thus come to? The Metropolitan Board of Works and the corporation. In 1866 agitation having been going on for some time, they managed to get a parliamentary committee appointed on a competing bill to enable the corporation to set up gas-works of their own. Their case was heard, but, before the case of the companies was completed, the committee intimated that it need not proceed further. The bill was rejected, although the committee made a report entirely against the companies. He (Sir E. Beckett) therefore protested against these parliamentary proceedings being made use of as being any judicial decision; it was an *ex parte* decision. Whatever value his learned friend thought it worth while to attach to the report of 1866, it was not worth one farthing as the result of a judicial inquiry, except to this extent—that even that hostile committee did not pass the bill which was brought in against the companies. In the same year the London Gas Company had a bill which went through the House of Commons apparently unaltered, and only in the House of Lords received the alteration mentioned by Mr. Stevenson, by the introduction of the 9th clause, which provided that whenever four companies in London had their price reduced or their illuminating power raised, the London Gas Company should do the same. That was not upon the general bill, a hostile bill, a regulation bill, but upon a bill of the London Gas Company itself. And he (Sir E. Beckett) had never contended that when a company brought in a bill itself it must not submit to such terms (of course he meant fair terms) as Parliament might think fit to put upon it. In 1867, Mr. Cardwell with all his anxiety to legislate against the companies (which he showed plainly enough) felt that to the question whether that regulation could take a hostile form only one answer could be given. He (Sir E. Beckett) asked Mr. Newton, "In what respect are you in a different position now?" And he could not answer. That was one of the questions that he evaded; that is to say, he gave several answers, or things that he called answers, to the question, but he never grappled with it. He said, "That is for Parliament to judge." Of course it was; but the object of putting the question was, to ascertain whether the most ingenious man, possibly the head of all the gas agitators as he is (the leader of the Metropolitan Board of Works in this matter—the chairman, as he described himself, of some committee with reference to this bill), could get out of that difficulty, and he could not point out any way whatever in which they were differently situated now from the way in which they were situated in 1867. The Legislation of 1867 and 1868 was: "We will not do anything against a company that has not a bill;" and that was not merely a declaration of Mr. Cardwell but the uniform action of Parliament from time immemorial; against which action he defied the Board of Works to produce a single case, and they had not attempted it. It was remarkable that in 1867 the bill which Mr. Cardwell rejected was a Board of Trade bill. He would not entertain even that. The bill was brought in with everything of consequence in blank—*i.e.*, with all the figures in blank. The Metropolitan Board of Works and the corporation were invited to go in and suggest fillings up of the blanks, and they took up the invitation, and in fact fought the bill. The Board of Trade and the Government did them the service of bringing in the bill; though, why they should bring in a bill for London more than for Birmingham he did not know. The bill was brought in with Mr. Farrer's sliding scale in it. Clause 28 was, "The maximum price per 1000 cubic feet chargeable by a company for gas shall vary according to illuminating power as follows:—For gas equal to 14 but not equal to 15 candles the maximum price shall be 3s. 6d." (At that time he thought all the companies were charging 4s. 6d. and 4s.; so that this was an absolute attempt at confiscation to the extent of 6d. or 1s.). "For every increase in illuminating power equal to one candle or more the price of 3s. 6d. may be increased by 3d. a candle, and for every reduction in illuminating power equal to one candle or more the price of 3s. 6d. shall be reduced by 3d. a candle, which scale is in this Act referred to as the prescribed scale of illuminating power and price."

The CHAIRMAN: When you say "sliding scale" you mean a scale of price sliding with illumination?

Sir E. BECKETT: Yes; there it slided with illumination, and now the idea is, to slide it with dividends. Then there is some more relating to dividends. This is the first exhibition of Mr. Farrer's brilliant idea of a sliding scale, I believe. Clause 34 provides that each company may pay a dividend for each half year in proportion to the illuminating power of the gas supplied by them. Then there is a proviso:—"Provided always that where the illuminating power is less than 12 candles there shall be no increase of dividend." I am told (what I do not know myself) that although the bill was printed in this form, these sliding scale clauses were actually struck out in consequence of something that took place in the House before it went to committee.

The CHAIRMAN: We do not know that they were struck out in consequence of what took place in the House.

Sir E. BECKETT: It can be easily proved whether they were struck out or not before it went to committee, but the important point is, that, although this was a Government bill, and although the companies consented so far as to let it go before the committee, nevertheless Mr. Cardwell gave that famous answer to the question whether he could pass it, and accordingly it was not passed.

The CHAIRMAN: It must have gone to the House in this form, because this is the form of bill printed for the House: "Prepared and brought in by Sir Stafford Northcote," and so on.

Sir E. BECKETT: But the question is whether the manuscript alterations were made before it went to the committee?

Mr. BRISTOWE: I understand you cannot say that that was the bill that was presented to the committee?

Sir E. BECKETT: No; I rather believe that it was, but I am not sure. I believe that in consequence of something or other the sliding scale clauses were struck out when the bill was presented to the committee, and therefore the bill was not presented to the committee to be passed in as bad a form against the companies as it had been introduced in the first instance; nevertheless it was not passed. In that report there is a statement that the Act of 1860 had not worked satisfactorily. I forget the exact words, and I will not waste time by reading it again, but I know there is that statement. One of my learned friends has found for me a passage in Mr. Cardwell's report of 1867, which, I think, throws a little more light upon this alteration of the bill. It is this: "Moreover, it appeared from what passed on the second reading of the bill, and from papers which have been already printed for the House, that before the second reading of the bill, communications had passed between the President of the Board of Trade and the companies, from which communications it resulted that the board was bound to proceed with the bill only upon certain terms; and, in answer to an appeal from the counsel of the companies, the counsel of the board thus expressed the result of those communications to the committee—viz., that the board was bound not to proceed with the bill unless the 10 per cent. were retained on the same basis, and on the same terms as they appear in clause 30 of the Act of 1847." You will remember that what I read to you before in the bill showed that they proposed to cut down the 10 per cent. absolutely to 7 per cent., besides a lot of other indirect cutting down by the sliding scale, and therefore this seems to confirm the information given to me *aliunde*, which was that the arrangement should not go before the committee without those clauses being struck out. Of course it did not mean that the bill was to pass. But all the companies in England were alarmed at this kind of thing. Of course they could have thrown it out easily enough themselves on the second reading, but they very foolishly, as I thought at the time, and think still, allowed the bill to come before the committee with that alteration.

The CHAIRMAN: If you turn to the top of the page you will see all about it: "But these proposals led to a strenuous opposition, and having been referred *pro formâ* to a committee of the whole House, the bill was ultimately sent to your committee with the clause for the repeal of section 2 of the Act of 1860, as regarded the company's rate of dividend, struck out, with blanks left in the bill for both the maximum price and illuminating power of gas to be supplied by the companies."

Sir E. BECKETT said it was pretty clear what took place; and it ap-

peared that some statement was made to the House accordingly, and, as it happened, that statement was made by Sir Stafford Northcote. They need not, however, go further into these details; they were of no consequence now; all that was of consequence to remark on was, that, although the bill was so mitigated, still Mr. Cardwell felt that he could not pass it. In 1868, Mr. Cardwell adhered to the resolution of 1867, but another thing took place of some little importance. Then there was a bill that could be dealt with. It was a bill introduced as the Metropolis Gas Bill, which was intended to apply to all the companies in the metropolis, and it was upon that bill that Mr. Cardwell repeated the remark that had been previously made. At the same time the Chartered Gas Company were in Parliament wanting extensions, having used up all their capital, and the Imperial Company were in Parliament not quite in the same condition, but still wanting an Act. The Chartered Company were driven to such extremities that they said, hard as they thought the terms put upon them, they must submit, because as Mr. Cardwell said that he would not pass their bill except upon those terms. Then came the question of how much further the thing should go. Inasmuch as the Chartered Company were supplying the City in competition (for competition there had not been meddled with in 1860) with the City Company and the Great Central Company, it necessarily followed that, whatever the Chartered Company submitted to in the City, the other two companies must submit to—there could not be two prices for gas within a small area; and as soon as the Chartered Company were driven to surrender, the other two companies were driven to surrender. Did Mr. Cardwell say, "Inasmuch as three companies have surrendered out of the 13, I will pass this bill"? No; but he said this: "I will turn the Metropolis Gas Bill into a City Gas Bill with consent," and that was all that he did in 1868. Then, afterwards, when the Chartered Bill came on, which embraced other parts besides the City, they had to submit to the same terms in the other portions of their district; but no other companies were driven to surrender outside, as they had been driven to surrender. At that time the Imperial Company had their bill in Parliament; but they were not driven to such straits as the Chartered Company, and, accordingly, they said to Mr. Cardwell, "This legislation of yours will absolutely ruin us." There were reasons why it would affect them more than it would the Chartered Company, and they said, "Rather than accept such legislation we will withdraw."

The CHAIRMAN: When you say that they were not in such straits, why were they not?

Sir E. BECKETT said it was because they passed a bill for raising capital through Parliament two or three years before. So that that tided, or would have tided, the Imperial Company over a few years more, and they declined absolutely to accept that legislation; and Mr. Cardwell, although he got his views backed by three companies and all the ex-district of the Chartered Company, did not feel at liberty to apply legislation against their will to the Imperial Company, and accordingly it was not applied. In 1869 the Imperial Company came to Parliament, and so did the South Metropolitan Company. Mr. Cardwell had then passed into another place, and so he could not be chairman of the committee, luckily for the Imperial Company. The Metropolitan Board appeared, of course, and then, according to their showing, nothing could be more sacred than the Cardwell legislation; there had never been such legislation in the world. Mr. Cardwell had settled the question for ever, just as some people thought he had settled the railway question for ever in 1854; and the Metropolitan Board of Works came and begged and prayed the committee to adopt Mr. Cardwell's legislation. What was Mr. Cardwell's legislation? The essence of it was, as far as the companies were concerned, revision. The Metropolitan Board of Works were perfectly satisfied with revision then, and the whole contest before that committee was whether the Imperial Company could afford to reduce its price to 3s. 9d., and give 16 candles, even with the protection of revision. The Imperial Company satisfied the committee that they could not; it did not follow that because the Chartered Company could, they could; it was a mere question of facts and figures. At the same time the Imperial Company said, "We know that it is not usual to grant to companies coming before Parliament for new capital as much as 10 per cent." The reasons were obvious. Inasmuch as they could not afford to come under the Cardwell conditions of price and illuminating power, they submitted to taking a dividend of 7 per cent. upon their new capital. The committee were satisfied by evidence that the company could not afford to make 16-candle gas, with penalties, at the price which was then proposed, and at the same time, of course, they accepted with gratitude (if Parliament was ever grateful for anything) their offer to take 7 per cent. instead of 10 per cent.

Mr. CRIPPS: Your bill was never brought in for 10 per cent.; it was brought in for 7 per cent. in the first instance.

Sir E. BECKETT: The bill was opened by me as a 7 per cent. bill, and I gave the reasons for it, and, if you want another reason, which must have been in my mind, it was this—that, a few years before, the Imperial Company had got its new capital upon the 7 per cent. basis. In short, we came in disclaiming the Cardwell legislation, excepting so far as we reduced our price from 4s. 6d. to 3s. 9d. Reducing it to 3s. 9d., of course we asked for revision, and we got it. The Board of Trade at that time, probably under Mr. Cardwell's instigation, was highly disgusted at that result, and they got the bill recommitted; but the committee came practically to the same conclusion, and, indeed, to the same conclusion upon all these points. There were two members added to the committee.

Mr. SHRUBSOLE: Mr. Locke and Mr. Cawley were added to the committee on recommittal, but without votes.

Sir E. BECKETT: What a very odd thing. I did not know the House of Commons had power to do such a thing. Mr. Shrubsole says that those two gentlemen were added as persuaders.

The CHAIRMAN: Was it a hybrid committee?

Sir E. BECKETT said it appeared to have been very hybrid. It was originally a very numerous committee, but it ultimately became, by the addition of those persuaders, more numerous still. At any rate, those persuaders did not influence the committee. The Chartered Company had been deprived of their reserve-fund by Mr. Cardwell; the Imperial Company protested strongly against that, and they protested without success. They asked for only 7 per cent. upon their new capital, they submitted to the 3s. 9d. with revision, and they got nominally 14 candles instead of 16. All this time the Metropolitan Board of Works were fighting with all their might and main for 16-candle gas, for no reserve-fund, and for other things, but not saying anything about revision, because then everybody believed that revision was intended to be the fair thing, and to act both ways. The new maxim had not been invented. After the Imperial Bill was thus obtained, the South Metropolitan Company came. That company were in the condition of being able to afford to take 3s. 6d. for reasons, generally speaking, that the committee knew. They had a small capital in proportion to their works; they had advantages in getting coal, being near the water; and they had advantages in selling residuals, coke, and things of that sort; and, therefore, for all these reasons, they were even then able to take a lower price than the Imperial. He (Sir E. Beckett) was their counsel, and he remembered having to say this for them:—"Now, inasmuch as we can afford to take these things, we do not come here protesting against the Cardwell legislation entirely—in fact, I think I may say not at all; but," he said, "inasmuch as we submit to the Cardwell legislation, we ask you to give us 10 per cent. for our new capital, and an illuminating power of, in consideration of a 3s. 6d. maximum price, 14 candles." The committee immediately saw the fairness of it, and he thought that anybody would see the fairness of it. If the Chartered Company were given 10 per cent. for submitting to Mr. Cardwell's conditions, it was only fair that the South Metropolitan, when they submitted to Mr. Cardwell's conditions, should also have it. The proposal to fix the illuminating power at 14 candles was violently fought by the Metropolitan Board of Works, but the chairman said this, after hearing Dr. Letheby's evidence, "We are satisfied that 14 candles is quite enough, and we shall only put 14 candles into the bill," and accordingly it was put into the bill. That was the history of legislation, so far as the House of Commons was concerned, in 1869. In 1866, 1867, and 1868, there was no opportunity for the House of Lords to do anything, except as regards the London Company in 1866, mentioned already. In 1868 there was no further opposition; the Chartered Company surrendered, and got their bill, and the Metropolitan Board of Works did not oppose it at all.

Serjeant SARGOOD: They petitioned against all alterations, and so did the corporation.

Sir E. BECKETT said they petitioned against any alterations being made in the bill; but there was nothing in the world to prevent them from asking for further restrictions. In 1869, in the House of Lords, the Metropolitan Board appeared and tried to get the legislation of 1868 forced upon the Imperial and South Metropolitan Companies, but they tried in vain. They talked about the Cardwell resolutions, and they used a great deal of very tall talk about the importance of Mr. Cardwell, and so on; but the committee of the House of Lords was not moved by that, and they said, "We are here to do justice with regard to the evidence upon the Imperial Bill," and accordingly they did it. If it was worth speaking of, the chairman of that committee happened to belong to Mr. Cardwell's side, so that he was certainly not moved by any political prejudices against him. Having gone through that history, and corrected some of his learned friend's deficiencies, which he repeated through Mr. Newton, and again through Mr. Stevenson, as if it could not be told too often, he (Sir E. Beckett) reminded the committee again that more than half of the £10,000,000 or £11,000,000 of capital raised in the metropolis for supplying gas had been taken on the faith of these Acts of Parliament; a great deal of it on the faith of the Act of 1860, and some of it, at any rate, on the faith of the Act of 1868, as regards the Chartered Company, and a great deal of other money on the faith of the Acts (for there were more than one) of the Imperial Company the Act of 1860, the Act of 1866, and the Act of 1869. The committee would remember the remark of Mr. Cardwell about companies who had taken their money on the faith of legislation. He would like to know what earthly thing had been said by any single man, even the most outrageous of them on the other side (and he would not say who he thought he was) against the proposition, that people who had subscribed their money on the faith of getting a 10 per cent. dividend should be deprived of it, provided that they did their Parliamentary duty? He would like to know with what kind of decency anybody could ask that these people should be deprived of that money. Did not Parliament always expect companies to keep their bargains with Parliament? And had not companies a right to say to Parliament, as representing the public, "Very well, then; you keep your bargain with us. You have told us that if we take these shares we shall get 10 per cent., if we can get it consistently with that legislation, and we say we have a right to it, and nobody has a higher right. We went in and subscribed our money on the faith of getting a parliamentary dividend if we did a parliamentary duty." What was the answer now made? "It is all very true; so you did, and we are very glad to have got your money; but we think that 10 per cent. is a great deal too much to have been given to old companies raising new capital, and although Parliament did it, Parliament made a mistake, and it ought to be taken away." All sorts of epithets might be applied to such a reply, but he was not going to apply any of them. All he said was that it had not been done yet, he was happy to know. He mentioned the Nottingham case a little time ago. There was a bill introduced by the Corporation of Nottingham last year, which embraced both the gas and water undertakings. It ended in the purchase of the Nottingham gas by an agreement such as he had described, giving the company a bonus upon their shares—*i.e.*, giving a perpetual annuity beyond all risk and question of whatever they were entitled to, and a little bonus besides. Now ordinary gas shares, of course, did not usually sell at the same rate as guaranteed annuities, but those people got guaranteed annuities and the bonus besides. The corporation also desired to buy the water-works. They then and there resorted to the same dodge as the Metropolitan Board did, of having a rival Construction Bill, a Works Bill, which came to the same fate. As he had already said, no rival bill had ever been passed yet, especially for corporations, if there was anything especial in negatives. But they proposed to buy the water at arbitration terms. He (Sir E. Beckett) represented the water company, and said, "I am entitled to keep these works and all their contingent advantages so long as I behave well." His learned friend, Mr. Venables, who was for the corporation, reminded him that he was wrong in saying "arbitration terms;" they offered terms analogous and equivalent to those of the gas company—*i.e.*, a bonus, besides an annuity representing the present value, or rather representing the maximum dividend. Speaking, then, for the water company, he said this: "I am entitled not only to my maximum dividend, which you offer me, but to the contingent advantages arising from the constant issue of new shares as the town of Nottingham increases. You have made no charge against me of not doing my duty. You have not told me that I do not supply good water. You have not complained of the price; of course you could not, because that was fixed. You have, in short, made no charge whatever against me, except that it would be for what you call the public interest—*i.e.*, for the interest of water drinkers, or rather, perhaps, I should say of water consumers at Nottingham, that you should have the future contingent advantages of being possessors of the water-works." He protested against that being done, and he protested with success. It so happened that in the same year there was another water bill for a place, not of the same magnitude as Nottingham, but involving the same principle. That was the Neath Water-Works Bill. The Corporation of Neath (or the public body holding the same position as a corporation would hold) brought in a bill for purchasing the Neath Water-Works, and there they said (and he must confess with some truth) that the water was bad. How was he to get over that? In this way. He said: "We know it is bad," and luckily for the company, they had been taking steps to mend it before they were in committee. If they had only taken steps in the course of the committee, he knew what would have been said. It became bad on account of the want of water in a very dry year, and so he said for the water company to the committee what he said now: "We confess it; we know we are bound to supply good water, and we are taking steps to do it. If you find a year or two hence that we are not taking steps with success, you will have a different case," and he resisted the purchase with success. There again were two late cases, and one could not spend time upon negatives. He had stated in the strongest way he could, and he defied it to be contradicted by any body, that there had never been a case of any description, as regards either water or gas, entertained by Parliament, equivalent to this present proposal. Perhaps he might as well turn to the present bill, and to what was the essential clause in it. When he said essential clause, he meant clause 6, whatever it might become. He would suppose it to be an up-and-down clause, as suggested by the Board of Trade, and would call it a sliding-scale clause. The sliding-scale upwards would mean that in some events, possibly, though very improbably, the companies might be able to reduce the price, and at the same time to raise their dividend beyond 10 per cent. That was a rough description of the sliding-scale upwards, and he would say that, supposing the committee offered that, the companies would not take it. If the committee chose to legislate against the companies, of course they must; but in the way of offering it to the companies, they would

not take it, and he would tell them why. The companies knew that the moment they divided a penny over 10 per cent. they would have an outcry from the Metropolitan Board of Works ten times as bad as any that they had had as yet. The board would say, "We accepted the up-and-down clause in 1875, because we knew that it would not act in favour of the companies; at any rate we strongly believed so" (as they believed that the revision clauses would not act in favour of the companies). "We are quite sure that Mr. Forster never could have intended it;" just as Mr. Newton had the face to tell the committee that he was quite sure that if Mr. Cardwell was sitting there he would not repeat what he said in 1867 and 1868. They did not stick easily at saying things. He knew perfectly well that the first company that divided over 10 per cent. would be exposed to that sort of storm, to perhaps two or three years of agitation, and to abuse in all the newspapers; for the newspapers all bought gas, and, of course, they were always ready to join in this clamour, and they always had done so. That was what they called public opinion, which meant private pocket. Then there was the great Farrer always ready with a new maxim. What splendid maxims there would be invented then. And then they would refer to what Mr. Stevenson said in 1875; they would say that what Mr. Stevenson said in 1875, even as to past capital, ought not to be regarded; that it was a stupid thing of Parliament to do, and *à fortiori* with regard to new capital. It was easy to conceive all these things. He could imagine the sort of speech that he should then make, if he were unfortunate enough to be in his learned friend Mr. Cripps's place here; but he was tolerably sure not to be, because he was happy to say that he had a general retainer for the Imperial, and therefore he should keep out of bad company.

The CHAIRMAN: That will prevent your quoting yourself against yourself.

Sir E. BECKETT said it would; but if he did have to appear on that side he should say, "Counsel on that occasion said so-and-so." That was one reason why the companies would not accept the sliding scale if the committee offered it to them now. Of course it was better, in a slight degree, than the other thing, but it meant the same thing in the mind of the author of it; it meant confiscation just the same. But how was such a dividend to be reached with any probability? It was barely possible, of course, that the price of coals and of labour might go down in such a way (though he did not know the period in which labour had gone done) that they might conceivably, speaking in a mathematical sense, be able some day to lower their price so much as to enable them to pay 12½ per cent. dividend. But it was not probable, and it was hardly possible; it was just theoretically possible, and no more. Therefore he said that the offer was a sham on the part of its author, and it was known to be. It was invented to back up his other maxim of sharing profit and loss, which he knew was a sham, or ought to know. At any rate, wiser people than he did. So much for the sliding scale upwards. He did not know that he need discuss it further, unless it got to clauses, which he hoped it would not. He would now say a few words upon the bill as it stood, and upon Mr. Livesey's evidence in support of it, taking with Mr. Livesey, for the present purpose, Mr. Stevenson. For fear he should forget it, he had a note to remark upon this. He had tried to test the coal and labour question with Mr. Newton, and asked him this question: Whether he did not know that coals and labour had risen in price all over the kingdom? Mr. Newton actually thought it worth while to evade that question by saying that he did not know what coals were in other parts of the kingdom. It was strange that a clever man should have thought it worth while to resort to these little evasions; however, it was only an illustration of the spirit in which the whole of this legislation was conceived and attempted, and it was because they had Mr. Farrer, and the Board of Trade, and what they were pleased to call, "Her Majesty's Government," to deal with that, they were apprehensive of any offers, however well they sounded.

The CHAIRMAN: I do not want to check you at all, but really the committee have only to deal with Mr. Farrer so far as his name happens to be attached to the letter of the Board of Trade. We have nothing to do with anything outside that.

Sir E. BECKETT said that was just what he was dealing with. That very document used the words that he used just now, and this thing was suggested, as Mr. Newton told him, by Mr. Farrer himself and (using the words in the paper) "by Her Majesty's Government." During his examination, Mr. Livesey was asked this: "With regard to your total working expenses, are they less per ton almost than any other of the metropolitan companies?" He answered, "The total working expenses are less, by nearly 2s., than any other company, including the general management. It is chiefly owing to our having bought coals cheaper." He (Sir E. Beckett) asked him whether the Imperial and other companies could not have produced gas as cheaply, to which the witness replied something to this effect: "I think they ought to have bought their coal cheaper." What did Mr. Livesey, the most experienced of all the witnesses, the gentleman who came there as Queen's evidence, mean by volunteering the statement that his total expenses, chiefly owing to his having bought coals cheaper, were nearly 2s. less than those of any other company, when it was not so? In Mr. Field's tables appeared the total working expenses in one column, and perhaps that was better than taking coals alone. In 1872, which they were told might be taken as a normal year (it was just when the change was beginning), it appeared that the total expenses of the South Metropolitan Company were 15·57 per 1000, and the Imperial expenses, strange to say, were 14·31 per 1000. Did that look like very wasteful and bad management on the part of the Imperial Company? In point of fact, the South Metropolitan expenses were very little indeed below the average of all the companies. It happened that there were two small companies with a higher figure, which made an apparent average of 16; but if they took their smallness into account, and measured them by their specific gravity, the result would probably be extremely different from this. But he (Sir E. Beckett) was chiefly desirous now to contrast the facts of the South Metropolitan against the Imperial, inasmuch as Mr. Livesey was there to prove bad management on the part of the Imperial Company, if he was there to prove anything. It seemed that, as to expenses of management, he was refuted on those very figures; he was refuted as to coal by the evidence given the other day. In 1872 the Imperial coal was a little more than his, but very little, his being 16s. 7d., and the other being 17s. 2d.; but in the bad year, the year in which the whole of this row and difficulty arose (the abnormal year, as he admitted himself), it was not so. In 1873 the South Metropolitan coal was 24s. 10d., and the coal of the Imperial Company, which he thought it worth while to abuse for their improvidence in contracts, was 24s. 1d. Look again at the Phœnix Company, which was one of the companies that he (Sir E. Beckett) represented (indeed, he represented, strangely enough, the South Metropolitan Company, so far were they from believing in Mr. Livesey). The Phœnix Company were more than 2s. below the South Metropolitan, being 24s. 2d., against the South Metropolitan, the model of management, with its 24s. 10d. Mr. Livesey said (or Mr. Stevenson more emphatically, and Mr. Livesey too) that coal was the chief thing, but here he was answered by the very tables which he appealed to, as he could not help doing, on that important point. Having abused the Imperial Company, and inferentially of, course, all other companies who made contracts, he explained the accident, as he called it, of the Phœnix Company being lower in the matter of coal than himself, by saying, "Ah, the Phœnix had a contract." One was always curious to see how a man who came in the character of Queen's evidence would break down; it was not often that they broke down so completely as that. He had all the glory to gain in getting up this case, and of being what he (Sir E. Beckett) could not help calling a traitor to his cause, going about writing pamphlets, making speeches, and offering himself as the gentleman who was going to let all the cats out of all the bags as regarded the metropolitan gas companies; and he said, "Nobody can get coal so cheap as I do; my company confide entirely in me" (he could understand the advantages of that) "to get their coal, and I get my coal so cheap that I can undersell anybody," but here were the facts staring him in the face.

Mr. CRIPPS: There are the facts, but you have not mentioned them.

Sir E. BECKETT said he mentioned the conspicuous ones. In 1873, the critical year, the cost of coals was less in the Imperial than in the South Metropolitan Companies. But observe this—the average of them all in 1872 was 17s. 6d. a ton, and at that very time the South Metropolitan Company, no less than the Imperial Company, could not help paying 24s. for its coal. What did that prove? It proved that the companies were not masters of the coal question, and it was evident that the large companies were less masters of it than the small companies, because a small company could afford to live, speaking in a rough way, from hand to mouth; they could pretty nearly always get as much coal as they required, whereas large companies like the Imperial and Chartered could not do that; and, unless they ran the risk of leaving one-third of the metropolis in darkness, they must look ahead and have long contracts. If it had turned out, therefore, that the contracts of the Imperial Company, in the important year, had made the price of coal more than the South Metropolitan price, it would not have been material; but, either by great good luck or by judicious contracts, it had not been so. The committee would have evidence, which he would not anticipate, of the difficulty which some of the companies had in 1872 or 1873, or in both years together, in getting coal. He did not pretend to be able to explain the whole of the difference between the prices; all that he was concerned with was to show that everything upon which Mr. Livesey's finger had been put, as an instance of want of care and management, had failed entirely. Yet there were some figures that had been partly given, and that partly could be given. According to Mr. Livesey's evidence and Mr. Stevenson's, the paying price of the South Metropolitan Company was 3s. 2½d.; they charged 3s., but they took from a sort of irregular fund which they had. The difference due to capital—*i.e.*, to the different portions of capital, in the South Metropolitan and the Imperial, they had all stated to be 6d. The next figure he did not think had been actually proved yet, but it would be deduced. The difference due to the net price of coals and carriage, in which the South Metropolitan Company had some advantages, was made out to be 2½d. per 1000 feet. If so, that brought up the South Metropolitan paying price to 3s. 11d., whereas the Imperial ordinary price (and the price in every year except one, the Imperial Company having only raised its price one year) had been 3s. 9d. In one year the Imperial Company did raise its price, with the permission of the commissioners, for abnormal reasons; but, with the exception of that, the South Metropolitan Company, which was brought forward as a model, were really making gas at a disadvantage of 2d., compared with the Imperial Company. If the South Metropolitan Company were really managing so very much better than the Imperial Company, it was evident that there was no explanation of it. Before the rise the Imperial Company, by its own good management, had actually reduced its price below the 3s. 9d., and it was charging only 3s. 8d. for two successive half years. That was a time when, according to Mr. Livesey, there was no motive for particular economy, although Mr. Livesey and other people were pleased to say that there was no motive for economy under the present system, it must be evident to any man, with three grains of sense in his head, that the time when there were the strongest motives for economy was when there was an abnormal state of things. When the companies were paying dividends easily, it might be that there was not much motive for economy; but the very year when there was the strongest motive for economy, in order to avoid going to the commissioners and encountering all this odium, was actually the only one in which the Imperial price was a higher price than that of the South Metropolitan. He would now strike off the 2½d., and take the ordinary price of the South Metropolitan—*i.e.*, 3s. plus 6d. plus 2½d.—*i.e.*, 3s. 8½d. against the Imperial price for a year, 3s. 8d., and for another period 3s. 9d. These witnesses had to prove that the Imperial Company wasted money to the extent of 11d. per 1000 feet. Just consider what that would amount to in gross money. It has been stated that 1d. amounted to £15,000; therefore, 11d. would be £165,000! If they were to account for the Imperial excess by extravagance, it must have been extravagance to the extent of £165,000! Was that a thing that would remain latent, and that could not be discovered by Mr. Livesey? Why did not Mr. Livesey tell the committee where this £3000 a week went to? He made a plunge into coals, which he certainly would not have done if he had not felt it necessary for his purpose.

The CHAIRMAN: My honourable friend has called my attention to the fact that certainly it appeared, in the course of the examination of Mr. Livesey, that he did not rest upon the coal.

Mr. BRASSEY: He rested upon the capital.

Sir E. BECKETT said it was perfectly plain that he did, but why in the world did Mr. Livesey, who prepared his own proof (because this was not cross-examination) volunteer the statement that the South Metropolitan total working expenses were less by nearly 2s. than those of any other company? He said that it was chiefly owing to their having bought coals cheaper. What sort of value could be attached to a Queen's evidence who gave evidence in that way? Of course, he was entirely wrong about the coal, and he was at last driven to capital—not to capital in the sense of merely giving the explanation that there was a fixed difference of 6d., which could not be got over except by the confiscation process, which Mr. Stevenson intimated was to come next, by writing down the capitals of companies by Act of Parliament, but in another way. The commissioners could not inquire into capital. What sort of capital could they not inquire into? The capital which excited their wrath most in the Imperial case was the Imperial conversion of borrowed money into capital, and they said that the commissioners ought to have been allowed to investigate that. First of all, could anybody in his senses conceive that the Cardwell revision clauses were meant to enable the commissioners to go back to the expenditure of capital a great many years before? In the Act of 1869 the first paragraph in the preamble actually recited the very thing of which these people now came to complain. They opposed the bill upon a heap of other questions—power, price, reserve-fund, and everything—and this clause staring them in the face, they either did not try to get altered, or if they did try they did not succeed; but there it was in the preamble of the bill. "Whereas by the Imperial Act of 1854 the Acts relating to the Imperial Company were consolidated and amended, and their share capital limited, and such capital is divided into shares, which have been fully paid up, and the company were authorized by the said Act to borrow on mortgage or bond £433,000, and they have borrowed the whole of that amount, and have, under the powers of the said Act, capitalized £260,000 part thereof into shares of £10 each." That was the iniquity, but that was not the only complaint; they fished up another. They found out that in December, 1873, the Imperial Company issued some fresh capital just before they were going for revision. Of course; that looked like a charming charge at first sight. Evidently the Imperial Company were issuing this capital in order that the commissioners might allow so much to make the dividends upon it. But what were the facts? The capital was issued because it was wanted; some of it actually then, and paid then, and the rest of it known to be wanted, and paid very soon afterwards. That was, of course, a matter of evidence. The commissioners could investigate all that, though they could not have investigated the other thing. Those were the two capital charges made against the Imperial Company, and upon such charges as those the committee were asked to conclude that they had been wasteful in coal, wasteful in working expenses, and wasteful in everything else. Not a single scrap of

wastefulness had been proved. With regard to the other companies, the same remarks applied, with this further thing to be said, that against the other companies there had not been a single charge of any description made. All these companies had the power of wasting money just as much as the Imperial Company had; they had the further advantage of being able to revise without revision, if one might use such a term—*i.e.*, they might simply announce that they would raise their price within certain limits, and leave it to the Metropolitan Board to contest it. They had nearly all done it, and a curious thing was that, though they had nearly all done it, and though there were all these things to be got up here, and they had had Mr. Livesey, and Mr. Stevenson, and all those people at work on the accounts, not a single charge was made against the 1860 companies; and against the Imperial Company the charge was the ridiculous one with which he had been dealing. It was hardly worth while to state in detail how the other companies had raised their prices, because it appeared on the tables before the committee. But it showed, he thought, that, as far as machinery and revision went, Parliament and Mr. Cardwell had better have been quiet, and left the legislation of 1860 alone. The fact was that what had made this disturbance was this requiring of all the pompous machinery of a formal investigation before the companies, under the Acts of 1868–9, could raise their price. The other companies were allowed to raise from 4s. 6d. to anything within 5s. 6d. in what he might call a quiet way. By bad luck, and by the urgency of the Metropolitan Board of Works three or four sessions running, the Cardwell Committee were induced to invent this more complicated and heavy contrivance. Everybody could see, as a matter of common sense, that if the Metropolitan Board of Works received notice that the companies were going, at a large expense to both sides, to apply to the commissioners for an advance of price, that was a thing that excited human nature a great deal more than a quiet raising of 2d. or 3d. at a time, as the other companies had done, amounting roughly to pretty much the same as the Imperial. And the curious thing was that the noise never began until these formal investigations began. They might have begun against the other companies, but though there had been many rises, yet not on one occasion had the Metropolitan Board ever thought it worth while to interfere. As he (Sir E. Beckett) said in 1868, the Act of 1860 provided very good machinery indeed for revision; it protected the Metropolitan Board of Works, because it enabled them to object to the revision if they thought it worth while to object; whereas the legislation of 1868 and 1869 threw it on the companies to begin and to have this solemn apparatus, which naturally caused a commotion.

The CHAIRMAN: Then you have discovered one thing upon which you and Mr. Cripps are agreed, and that is that you do not value the revision clauses of 1868.

Sir E. BECKETT: Not if you leave us those of 1860. You do not suppose that I am going to take a minimum price cut down to the lowest possible figure, without the power of revision. The revision of 1868 is founded upon the price of 1868. In 1860 the companies were limited to 4s. 6d., which was, practically speaking, their then price, but with a power of raising to 5s. 6d. by revision; and to that we should be quite content to revert, though I do not suppose that Mr. Cripps would.

Mr. CRIPPS: They are entirely inoperative until you get up to 4s. 6d.

Sir E. BECKETT: I do not mean, of course, to ask for power to go back to 5s. 6d., but I am dealing with machinery. It will be a matter of adjustment afterwards as to how that should be done.

The CHAIRMAN: It is a fact, is it not, that all the companies which were mentioned in the preamble of the Act of 1860 are now under the Board of Trade?

Serjeant SARGOOD: No; only those who are affected by the 1868 Act, or who chose to adopt it.

The CHAIRMAN: I do not quite read it so. Section 3 of the City of London Gas Act of 1868 says: "And the Act of 1860 so amended shall, as to all the companies mentioned in the preamble of the said Act, be read throughout as if the Board of Trade had been inserted there instead of Her Majesty's Principal Secretary of State for the Home Department." While this Act does not put all the companies mentioned in the preamble of 1860 under the revision of 1868, it does put all the companies mentioned in the Act of 1860 under the Board of Trade instead of the Home Secretary.

Sir E. BECKETT said it did look as if it was so, certainly. The machinery was changed, but it was not of any great matter. The companies were not making any objection to either the one or the other. In the years 1870 and 1871, the two last, which Mr. Stevenson called his two normal years, taking all the companies together, there was a surplus beyond what was enough to pay the maximum dividend of close upon £43,000. The Chartered Company in that year had a deficiency, but the other companies had a surplus, and the result was that there was, on the whole, a balance to the good of all the companies of £43,000. In 1871 that balance was a little better—in fact, it was then £46,000—and then the Imperial Company had begun to lose a little and the Chartered Company had recovered. But so soon as the abnormal state of things began, then, taking all the companies together, the surplus of £46,000 was turned into a deficiency of close upon £60,000, and in 1873 that deficiency increased to £70,000. Taking with this the net price of coals, he thought it would enable the committee to see a good deal how these things took place. The net price of coals in 1870 was 9s. 4d.; in 1871 it was 9s. 5d., practically the same; in 1872 began the great rise of labour and materials, but the rise in the price of coals had not yet come much into action, and accordingly the average net price of coals upon the contracts in existence in 1872 seemed to have stood still at 9s. 1d. But, nevertheless, the rise of labour and materials alone (and that was an important thing to remark) made a difference to all the companies of above £100,000. It was not very easy to make out, through the evidence of Mr. Livesey and Mr. Stevenson, how much was due to each, but this certainly showed that more was due to the rise of the price of labour than either of those gentlemen was inclined to admit. And this seemed to him to be very decisive upon the point that he was discussing a little time ago—viz., that although the price of coals might go down again, yet, unless the labour and materials went down also, they could not reckon again upon having a state of things equivalent to that which was normal before 1872. Of course, all these figures, and many more, were open to the investigation of Mr. Livesey, Mr. Stevenson, and the commissioners. Questions without number, pages and pages of questions, were addressed to the companies by the Metropolitan Board of Works before they came to the commissioners, and the Metropolitan Board of Works were, of course, advised by Mr. Livesey and Mr. Stevenson, and, for anything he knew, by more people of equal skill, as to the questions to be asked. Did the companies say, "We will wait till we go before the commissioners, and we will answer such questions as they put to us, and we will not answer voluntarily questions of yours?" The committee knew perfectly well that they did not. He did not know how they were to get—he would not say gratitude, for that was not to be talked of with such people, but any decent recognition of fair behaviour. Could any human being pretend that, after they had had the advantage of the assistance of such people as those whom he had mentioned, they did not know every question that they could possibly want to ask? Of course they were not satisfied; they wanted to have a power of raking over the books continually; in short, they wanted to have the business of the companies carried on under their supervision. He did not know why the business of a gas company was to be carried on under the supervision of the buyer any more than the business of any other manufacturer. Of course it would be said, "You have a monopoly." "Very well, then," he replied; "are railways to be carried on under the supervision of travellers?" Was there anything at all parallel to it anywhere? The conditions which Parliament had put upon gas companies were conditions which they must observe, and, as long as they did observe them, the public had no right to complain. He admitted that if the Board of Works had pointed out some cunning fraud, or had shown that by some dexterous contrivance the companies evaded what was manifestly the intention of the Act of 1868, as read by any man of ordinary common sense, it might be right to correct that; but such an admission did them no good, because the companies had not attempted anything of the kind from the beginning to the end. On the contrary, whenever Mr. Livesey was put to it, he rather volunteered to say that he assumed that they behaved well, although it was necessary for his argument to assume that they had behaved ill. He said, "I do not assume that they have managed their works badly." He (Sir E. Beckett) said, therefore, that upon evidence of this kind the companies were acquitted already, because a non-proof of charges of this sort was an acquittal. If this was anything but a metropolitan agitation to reduce the price of gas—if it were a railway bill, or any common concern that came up from the provinces—he would like to know what case there was to go on with. However, the promoters had chosen to go on, and he must follow them a little further. What he was now doing was, of course, not in the slightest degree conceding that the preamble of the bill ought to pass, but examining the bill generally, as people do even on second reading in the Houses of Parliament. The price question was dealt with in clause 6 and its appendages, on which, he thought, he had said enough, and he did not discuss the appendages in detail, 48A and 48B, because he supposed he might assume, from what the committee had said that morning, that they were not satisfied with them, and therefore he would pass them by. The next provision was clause 7, which provided that the gas supplied should be 16-candle gas, and he asked, was there any necessity for legislation upon that point? He would not go through anything that had been said about the burners, because the chairman summed it up in a question the day before sufficiently to show that he understood all about it; and apart from all that, there was the fact proved by the tables, that, practically speaking, all the companies were now giving more than 16-candle gas. He did not mean to say, and he did not pretend to say, that they were giving as much as they would be obliged to do if the committee put them all under penalties; but he meant to say that if the Act of 1868 was intended, as of course it was, to secure to the public, on a fair average of trials, 16-candle gas, they had got it. Whether they had got it by the accidental operation of the change of burner, or by the voluntary action of the companies, did not signify; they had got it, and they had had it all along, or at least for a long time, and therefore it could not be necessary to pass this bill with the view to secure to the public what they had got. And the more so because the committee might be quite sure of this, that supposing this bill were rejected, as he hoped it would be, and the companies then fell back, and did not give as good gas as they had hitherto been doing, of course they would know that they were then bringing upon themselves a storm greater than before. What he said about the motive for economy applied quite as strongly to the illuminating power. The strongest motive for economy was the desire to avoid things of this sort, and applied to the illuminating power as much as to the price. With regard to the pressure clause, if he was not mistaken, the promoters advanced from the last legislation of requiring a pressure of 8-10ths of an inch during the test time to what was called in gas language 10-10ths of an inch or 1 inch. The companies that he represented were only liable to give a pressure of 8-10ths of an inch. Without any reason being given for it (he did not know why these things were to be done without reason), they proposed to increase that to an inch. That might be right or wrong; but were people to carry Acts of Parliament merely because they wished to carry them? Had Mr. Stevenson, or Mr. Livesey, or anybody else said anything about the necessity of an inch pressure? Not a word. He was told also by his learned friend, Serjeant Sargood, who knew all about it, that the penalties had not hitherto applied to pressure at all. Passing on from that clause to the referees, it was proposed to alter the present arrangements in this curious way. At present the referees were appointed by the Board of Trade. The promoters were not satisfied with that. He would like to know why? Did they mean that the Board of Trade was too favourable to them—that it appointed referees for a mere chemical and scientific purpose who did not do what they ought to do, who were incompetent, or anything of that kind? They had not suggested that; but there is the provision in the Act of 1869 that the Board of Trade should appoint three competent and impartial persons, one of them having practical knowledge and experience in the manufacture and supply of gas, who should be called the gas referees; and, in case of a vacancy, should appoint a competent and impartial person to fill the vacancy, one of the three, at least, being always qualified as aforesaid. The people specifically called referees I find were introduced in 1868.

The CHAIRMAN: There was nobody, I think, appointed by the Board of Trade under the Act of 1860.

Mr. BRISTOWE: Under the Act of 1860, I think there is a power for certain authorities to appoint an inspector to inquire into the quality of the gas. That is section 7 of the Act of 1860.

The CHAIRMAN: And there is a matter still stronger than that in clause 27, as to an examiner of gas; but then it is the local authority that does it.

Sir E. BECKETT said it was very remarkable that, having those clauses in 1860, they had come before Parliament over and over again and said that they were not sufficient, the fact being that they only twice tried to put any of those powers of 1860 in force, and they contrived to make some blunder on both occasions. On one occasion the magistrate to whom they applied himself said that he could not go on with the case. They never amended their proceeding, nor did they ever take any fresh one. And yet, as regarded six of the companies, they had still the power of obtaining from the Secretary of State the appointment of what was called an inspector. They had also power to provide testing apparatus and to appoint a competent person to test the gas. The committee know what the provision was in 1868. Contrast the legislation of 1869, with the provision in the present bill. The latter said that there were to be three competent and impartial persons, called gas referees, appointed. How could they secure their impartiality by making one to be appointed by the corporation and the Metropolitan Board of Works, and giving another to the companies? What did that mean? It was like appointing two arbitrators and an umpire; it meant two partisans and the arbitrator. Who was the arbitrator to be? The Board of Trade man. So that, practically, it came to this, that instead of the Board of Trade appointing the three men, as they were to do under the Act of 1869, one of them required to be a competent person with gas experience, they dropped the experienced man altogether, and subjected the whole of this matter practically to one single man appointed by the Board of Trade, who might not even be a literary gas man, but might be anything at all. Was that an improvement? Why did they do it? They gave no reason, except that they would like it. In fact, they liked the idea of interfering anywhere. If they could get a man in, they thought that was some advantage to them. It was true that they had not the face to propose to put a man of their own in without one of anybody else's. The companies did not want to have this thing done in a partisan spirit at all, but they preferred very much to be under three men, two of whom might be trusted, on the whole, to be impartial. They preferred that greatly to even having a partisan of their own. That was the criticism which he made upon that clause. Then there was another very important clause, No. 20. Here was a new power given. He understood now better why they wished the thing to be given to the Board of Trade man. "The gas referees, and the gas umpire appointed by the Board of Trade, shall from time to time prescribe and certify the situation and the number of the testing-places, and the apparatus and materials therein for testing the illuminating power and purity of the gas to

be provided by each gas company, one such place being prescribed for every station from which gas is supplied in each separate district supplied from such station, and each gas company shall provide and maintain such testing-places, materials, and apparatus accordingly." He would tell the committee, incidentally, the reason for the interlineation of "materials." His learned friend, Mr. Richards, informed him that they had just had a judgment against them on some questions that they raised about materials. In fact their view was this: the moment a decision was given against them by the commissioners, by the law officers of the Crown, or by anybody else, they should go to Parliament and regulate it. It cost them nothing to do so; they did not pay the bill, the public had to do that. The Metropolitan Board of Works got an Act through Parliament some years ago, which no other corporation had, enabling them to bring in any number of bills. They might bring in a bill, he was going to say, every week, so far as was consistent with the Standing Orders, against everybody in London. They might promote a bill to take his (Sir E. Beckett's) house for a public office for the Metropolitan Board of Works, or anything else, and he would have to pay the cost of it. But there was a more important thing than materials. In 1860, and he thought in 1868 and 1869, there was a great contest as to the distance from the works at which the testing-places should be. It was always stated, and he supposed truly, that gas lost its illuminating power by travelling. There had been some evidence as to that, or some difference of opinion as to how much it lost, but he fancied that there was no difference of opinion that it did lose illuminating power by passing through the pipes. Accordingly there had always been a contest on behalf of the Metropolitan Board of Works for getting the testing-places as far as possible from the works, and, on the other hand, by the companies for getting them as near as possible; and that contest was settled by a compromise or decision of a committee desirous to do justice, by fixing upon 1000 yards. What had happened? No gas company could now get any new works in London, and they could not enlarge their existing works there. The Imperial Company tried, a few years ago, to enlarge their works at Fulham, and the then Bishop of London, the present Archbishop, got up a storm against them in the House of Lords, and the bill was thrown out, and they were driven out of London. The Chartered Company also had been driven out of London. There was another attempt on the part of the Imperial Company to get some works in the neighbourhood of Victoria Park, but they were driven away from that, and they were sent to Bow Creek. These people drove the companies farther and farther out of town, and being driven farther and farther out of town, of course the gas lost more, according to their doctrine, which he dared to say was true; and, not satisfied any longer with the distance of 1000 yards, they now desired to have the testing-places at whatever places the Board of Trade umpire might fix. At the same time they talked about the quality of gas with reference to the burners, and said, "Inasmuch as the burners have improved, you must raise the absolute quality of the gas," although, as he had said, they had voluntarily raised it. In other words, if this clause was to pass with the alteration of the testing-place, supposing that the Imperial gas would lose a candle or two by being made at Bow instead of being made at the existing works, this clause, simply under the guise of mere testing, gave a difference of two candles, which they themselves, in their sliding scale of 1867, valued at 6d. (overrating it a little, he confessed; the fair thing would be to say 4d); so that this clause again was an attempt to impose a loss of 4d., or an additional two candles, upon the companies. There was a story told in the course of the evidence for the promoters, which, to be sure, did not concern him as much as the Chartered Company, and therefore he need not say much about it; it was some wonderful thing that had happened with regard to the Chartered gas dropping in illuminating power out of official hours. No such charge was made against the Imperial Company, and he merely backed up what he supposed the Chartered Company would say, that he entirely disbelieved it as a practically possible thing. He dared say that Mr. Stevenson, for a particular experiment, could manage the thing; but that it could be kept up for any considerable time, or done as a habit, on the enormous scale on which things were done by the companies, they utterly and totally disbelieved, and their engineer would give the reason for that. However, he would leave that for the Chartered Company to deal with more specifically hereafter, as the charge was made against them, and not against any of the other companies. There was another little thing he might mention, which showed the spirit of the whole concern. Section 55 said: "Section 38 of the Act of 1860 shall be read as if the Lands Clauses Act of 1845 were therein mentioned instead of the Company's Clauses Act of 1845." He wondered whether any of the committee had the least idea of what that meant. It was just one of the small pins that this metropolitan elephant condescended to pick up with its trunk. It meant this: The Lands Clauses Act of 1845 made it impossible for the persons who took land to obtain any of the costs of the arbitration. That was the practical result of it. The Companies Clauses Act left it to the discretion of the arbitrator to say by whom the costs should be borne, and the Lands Clauses Act did not. All that the Lands Clauses Act said was this—that if the company or the undertakers, as they were called, offered as much as was given, then the other people should pay their own costs. The undertakers had to pay their own costs in any case, and so the Metropolitan Board of Works had thought it worth while to stick this clause into this bill in order to get from the people with whom they were dealing the small amount of costs which might sometimes be got against the discretion of an arbitrator. And that was put in against all the companies who were under the Act of 1860.

Mr. CRIPPS: Are you aware that it is copied from the Act of 1868?

Sir E. BECKETT: Supposing that it is, I represent six people who are not under the Act of 1868. The Act of 1868 was not a Regulation Act, and this is.

Mr. CRIPPS: It is a mare's nest.

Sir E. BECKETT said there was one more topic, and that was the question of the auction clauses. He would either leave out of consideration the auction clauses altogether, or if he was to go into that matter at all, he would take it up at the next meeting. It did not relate to this bill.

The CHAIRMAN: There is nothing about auction clauses in the bill.

Sir E. BECKETT: I only thought you might desire that I should go into it, because you asked Mr. Stevenson the questions voluntarily yourself.

The CHAIRMAN: I was not surprised at the objection being raised and assented to, in fact, that it was not in the bill. That part of the letter of the Board of Trade perhaps rather more refers to the two other bills that are sent to us than to this bill. If you do not wish to enter into that question, do not do so.

Sir E. BECKETT: I do not think I shall; but it is possible that I may have to do so.

(To be continued.)

TUESDAY, MAY 4.

(Before Mr. A. W. PEEL, *Chairman; Mr.* RANDALL PLUNKETT, *Mr.* HOLMS, *and Captain* POLHILL-TURNER.)

STOCKTON AND MIDDLESBROUGH WATER BILL.

(Concluded from page 935.)

Dr. *William Odling*, examined by Mr. BROWNE, said he was a Fellow of the Royal Society, a Fellow of the Royal College of Physicians, and Professor of Chemistry at the University of Oxford. He had had considerable experience in the analysis of water, and having seen Dr. Frankland's analysis of the Tees water, considered, as it contained such a quantity of organic nitrogen and carbon, that it was unfit for domestic and dietetic use. The analysis on the whole was favourable to the view that that organic matter was to a considerable extent of sewage origin.

Cross-examined by Mr. SOMERSET: He had not analyzed any water himself, but took Dr. Frankland's figures. It was preferable to analyze the water for one's self rather than depend on some one else. Dr. Frankland's opinion was that previous sewage contamination was a very great fault in water, but witness did not think he put that forward so strongly as he used to do. He did not think it was correct of Dr. Frankland to take the quantity of nitrogen in the form of ammonia and in the form of oxidized nitrogen as the measure of the previous contamination of the water with sewage. With respect to oxidation, he did not go to the same extent as Dr. Frankland, who, though he had made many experiments upon this subject which were entitled to great consideration, had failed to convince witness. In Dr. Letheby's analysis of the water, which he obtained from the intake, there was nothing to show that it was otherwise than an exceedingly good water. This would also apply to the water taken from the taps at Stockton and Middlesbrough.

Re-examined by Mr. BROWNE: There were many cases in which cholera and typhoid fever were clearly traceable to persons drinking water contaminated with sewage. If the water examined by Dr. Frankland was taken from Tees Cottage, undoubtedly it was unfit for human consumption.

Mr. *William Bulmer*, C.E., examined by Mr. BROWNE, said he was a member of the Middlesbrough Town Council, and had taken an active part in public affairs. The charges for water were excessive for domestic supplies and to the smaller works of the town. In 1870 he consumed 160,000 gallons, and the average price charged him was 1·63*s.* per 1000 gallons. The water was very good for boilers, but he did not approve of it for domestic purposes. Since he had seen the pollution above the intake, he had not drunk two glasses of it. He thought that storeage reservoirs higher up the river would give the company an almost unlimited supply. There was no hostility on the part of the corporation to the company, but to the water and to the high charges. The small ironmasters had to compete with the large firms, and were charged at a very much higher rate for water. He believed that if a firm came within 800,000 or 900,000 gallons of the 5 millions at which the low scale commenced, they would waste that quantity in order to be charged at the reduced price. The meter charge was also too high. He had a meter which was worth about £2 10*s.* or £3, and he was charged £1 1*s.* a year rent for it, without the option of supplying one of his own. He, as a member of the Finance Committee, objected to the rate at which the corporation were charged. The stoppage of the water supply without notice was very dangerous, especially to those who had small boilers and no storeage.

Cross-examined by Mr. LUCK: He did not pump from the river, because his works were half a mile off. He did not know a single company that allowed their customers to supply their own meters; but that was no reason why it should not be done now, when the attention of the committee was called to it. He did not know any town where there was a less rate charged to manufacturers than at Middlesbrough. In 1872 he went up to Middleton-in-Teesdale, and afterwards saw Barnard Castle and Gainford, but not the river at the pumping station. He took no samples of the water at these points, nor any measurements. He had no idea of the quantity of water in the river, but he thought it very low. He objected to the supply on the ground of the pollution of the river at the intake. There had been illness in his family, but he could not trace it to the water.

Re-examined by Mr. BROWNE: He examined the bed of the river at Barnard Castle, where the sewage came out, and at Gainford, and it was in a very black and filthy state for a considerable distance. The sewage laid in the bed of the river as he went down the course of it. He was astonished at the comparatively small quantity of water in the Tees. Supposing the flow to be 27 million gallons a day past Tees Cottage, he did not think the company should be allowed to take more than 60 million gallons a week, as they did at present. They ought to construct storenge reservoirs above the source of pollution. He had a repugnance to the company's water, and had it filtered before use in his family.

Mr. *John Dunning*, C.E., Middlesbrough, examined by Mr. BROWNE, said he was chairman of the Corporation Gas Committee. The water supplied by the company was considered bad, and a better kind could be got in the upper part of the river among the tributaries, which might be stored in times of flood for the supply of the district. There would be no engineering difficulty in doing so; it would only be a question of cost. Mr. Hawksley's theory as to the cost of gravitation works was contradicted by the case of the Newport works, which had a storeage capacity of 15 million gallons, and the supply was only charged 5 per cent. upon the rental from the gravitation works, and 6 per cent. from the pumping station. Then Plymouth, with a population of 74,000, supplied 3 million gallons daily with a gravitation scheme, and charged 2*d.* per 1000 gallons for trade purposes, and for domestic purposes just one-half the price charged by the promoters company. He put in a long list of towns in which the charges for domestic supply were 50 per cent. less than those of this company. It was perfect nonsense to say that the trade of the district would cease if the company could not get more water from the Tees.

Cross-examined by Mr. RICHARDS: The corporation bought the old gas company up, and he had recommanded the corporation to buy the water-works. He knew why the low scale of 3*d.* per 1000 gallons on a consumption of 5 million gallons was made by Parliament, as he was present. It was a penalty agreed to by the companies rather than that the ironmasters should have the bill, which they were promoting at the time, passed. He thought the scale should be revised, so as to make the charges fairer between certain points. The company would then save water which was now wasted.

Re-examined by Mr. BROWNE: The corporation only wanted a pure supply of water on reasonable terms. If the company would reserve their pumping station for the manufactories, and lay a line of pipes to the waters at the head of the river for domestic purposes, it could give such a supply.

Alderman *Wilson*, chairman of the Finance Committee of the corporation, examined by Mr. BROWNE, said he thought the scale of charges was too high. The water, being polluted, was unfit for consumption.

Cross-examined by Mr. RICHARDS: He was in favour of the corporation having the water supply in their own hands, as they were as well fitted to work it as any other corporation.

Alderman *Todd*, chairman of the Streets and Building Committee knew the Tees pretty well, and was in favour of a gravitation scheme.

Mr. *James Mansergh*, C.E., examined by Mr. BROWNE, said he had superintended the Middlesbrough sewerage works. The filtration at the company's works was too rapid. There ought to be a larger capacity for subsiding reservoirs, to allow of the intake being occasionally stopped. The drainage area of the Tees was 312 square miles, and there would only be a flow of 27 million gallons per day. No more than the 60 million gallons per week should be taken by the promoters company, or in a few years the river would be pumped dry, for Darlington had no restriction as to the quantity they might take. The restrictive clause ought not to be repealed. Mr. Hawksley had said it would be necessary to go 70 miles in order to construct gravitation reservoirs; but there were several sources much nearer; from two of them 20 million gallons per day could be had, which would be more than sufficient for the domestic consumption of Middlesbrough ten times over. The nearest would only be 15 miles from the pumping station.

Cross-examined by Mr. RICHARDS: No doubt every drop of water thus intercepted would be prevented from flowing into the Tees. There were really no subsiding reservoirs at the pumping station, for they did not contain more than a day's supply, and there was no time left for the water to subside.

By the COMMITTEE: Suppose the colouring matter of the water to be peat,

storeage reservoirs would to some extent take it out. The action of the air took out the colour more than simple deposition.

Mr. *Edwin D. Latham*, borough surveyor of Middlesbrough, examined by Mr. BROWNE, said he had repeatedly examined the bed of the Tees, and found it very foul, particularly at Gainford, Barnard Castle, and Middleton. He did not consider it a fit source for a water supply. He knew the district above Middleton, and in the large valleys there was every requisite for storeage reservoirs, together with an abundant supply of water. He took the samples, which were sent to Dr. Frankland on the 8th of March, from the intake from Gainford and from other points. The river was then in a state of flood, and he took the samples fairly, after which the bottles were sealed up and sent up to London.

Cross-examined by Mr. RICHARDS: The water was turbid through the river being in a state of flood.

Mr. *John W. Leather*, C.E., of Leeds, examined by Mr. BROWNE, said he had inspected the Tees from Tees Cottage to High Force on the 9th and 10th of March. He was present when the samples of water were taken by last witness, and they were fair samples of supply. The minimum flow of the river at Tees Cottage he calculated was 27 million gallons per day. He did not think the company ought to be allowed to take more water than they do now, without making impounding reservoirs. He did not agree with Mr. Hawksley's evidence as to the cost of a gravitation scheme. The sewage of Barnard Castle would reach the pumping station within eight hours, so that there was not much time for oxidation to take place.

Cross-examined by Mr. RICHARDS: He did not see that the amount of capital expended by the company made any difference to the public, except that it would do so if the corporation wished to purchase the works.

By the COMMITTEE: Mr. Hawksley was engineer to the corporation water-works at Leeds, in connexion with the borough engineer, Mr. Filliter.

WEDNESDAY, MAY 5.

Mr. STEPHENS said they had been considering what further evidence should be called on behalf of the Middlesbrough Corporation; and although they had more medical evidence as to the sewage of Barnard Castle and Gainford, they thought the committee had heard sufficient on that point, and they, therefore, would confine themselves to some engineering matters.

Mr. *John F. Bateman*, C.E., examined by Mr. BROWNE, said he had experience in relation to gravitation water-works at Liverpool. The cost of the gravitation works there was £100,000 per million gallons delivered, which included the purchase of the old company. At Glasgow it was about £60,000 per million gallons.

Mr. RICHARDS objected to this evidence.

The CHAIRMAN thought it was travelling outside of the limits which had been laid down as to an alternative scheme.

Examination continued: He thought that the probable minimum flow per 1000 acres in the valley of the Tees would be rather less than the average, about a quarter of a foot per 1000 acres. A well-constructed filter should filter about 6 inches in the hour. If a company filtered 9 inches per hour, it must be through very coarse sand, and would not be efficient filtration.

Cross-examined by Mr. RICHARDS: Growing peat discoloured water more than decaying peat; it was unpleasant to the eye, but it was not dangerous to drink the water unless it was very strong.

Mr. *Thomas H. Bell*, Mayor of Middlesbrough, examined by Mr. STEPHENS, said he was a member of the firm of Bell Brothers, ironmasters at Port Clarence. For eight furnaces which they had in operation last year they took from the company in the year 1874 about 87 million gallons of water. Of this, 84 million gallons were for blast furnaces alone. That was between 500 and 600 gallons per ton of iron produced at the works. A number of tuyeres having been broken, it was thought to arise from the use of tidal water, and they arranged with the company for water. They found now that whereas they formerly used 69 tuyeres a year, they now used 66. The difference was so small as to be quite inappreciable, and showed that the cause of the destruction of the tuyeres was clearly not the water.

Cross-examined by Mr. RICHARDS: He was in favour of the corporation supplying water. He would be prepared for the corporation to buy up the existing company, of course, at the lowest price. He could not see that the corporation were trying to cripple the company so as to buy it more cheaply. On the whole, the company had served the district fairly well.

Re-examined by Mr. STEPHENS: The question was not so much what they had done in the past, but what they proposed to do for the future.

This closed the case on behalf of the Corporation of Middlesbrough in opposition to the bill.

Mr. MICHAEL then addressed the committee on behalf of Mr. Surtees, contending that a great injury would be done to him by the proposed abstraction of the water.

Mr. *Frank W. Elam*, examined by Mr. MICHAEL, said he rented, in partnership with his father, the mill and farm at Dinsdale. They had occupied them for six years. For about three years there was an opening, but not a fish-pass, on the Yorkshire side of the river. The first summer he was there the weir was dry the whole length, and they had to put planks in the opening to get water for the wheel. The fish-pass was altered by Mr. Cail in 1872, and in summer time they had only sufficient water for two pairs of stones, and could not work full power at the present time. He had frequently seen the dam dry, so that people could walk over the top of it. That would be for two or three weeks together, except on Sundays. He was overseer of the poor for the parish of Low Dinsdale, and last year the right of fishery was let at £100 a year, and rated on £83 5s. The mill had never been entirely stopped since the pass was put in, in 1872.

Mr. *Richard Cail*, C.E., of Newcastle-on-Tyne, examined by Mr. MICHAEL, said he was ex-Mayor of Newcastle and one of the Commissioners of the River Tyne. He had known the Tees generally for many years, and intimately since 1868. The occasional floods were very rapid, and at other times the river was very low. He had frequently been at Dinsdale, and constructed a fish-pass, the plan of which he explained to the committee.

Some further evidence was given on behalf of the opposing petition of the Tees Conservancy Board.

Mr. BIDDER then addressed the committee on their behalf. He declared that there was no class of bill more difficult to oppose than a water bill, as water was a necessity; and when it was represented that a large population was inadequately supplied with water, it required a very strong case to induce a committee to throw the bill out. But that was not so in the present case; for neither the health nor sanitary condition of any district would be injured by the rejection of this bill. The proposed new districts could be supplied without giving the company the powers they sought. The principal supporters of the scheme were the chairman and officials of the company, and the independent witnesses only spoke to the fact that the water did not hurt them, and that water would be required for some new iron-works. He reviewed the evidence which had been given in support of the bill, and maintained that the only reason for which the additional supply of water was required was to assist in the manufacture of iron. Of course, the water company wanted to be able to get their water at the lowest possible rate, so as to make the greatest profit they could out of it, and that was why they wished to take it from the river at their very doors. The conduct of the promoters reminded him of a story told of two itinerant sellers of birch brooms. One complained to the other, "I don't know why it is you are able to undersell me, for I steal the birch twigs of which my brooms are made, I steal the wood for the handles, and I steal the string with which I tie them up." "Ah," replied the other, "I steal my brooms ready made." That was exactly what the water company wished to do in the present case. They wished to take their water ready made, without cost and without trouble, and to sell it to the best advantage. It was for the committee to look not merely to the pockets of the company, who wished for a good investment, but to the interests of other persons affected; and he maintained that there was no good reason for declaring the preamble of the bill proved. The committee had to balance private and public interests, and where they were in conflict, private interests must give way. In the present case the promoters of the bill represented private interests, for they only sought their own profits and the advantage of a few ironmasters. The people of the district were strongly opposed to the bill, and he confidently appealed to the committee to reject it.

THURSDAY, MAY 6.

Mr. BIDDER resumed his address to the committee on behalf of the Tees Conservancy Commissioners, urging that the ironmasters were, as a body, hostile to this scheme, although it had been represented as being in their interest. The evidence of Mr. Dodds, and several representatives of the ironmasters, was direct and clear to this effect. One firm was shown to take the company's water only for boiler purposes, as they found it cheaper to use the river water for all other purposes. If that was the experience of the largest firm in the district, it was scarcely likely that the smaller firms would feel the want of the company's water very much. There had no doubt been a large increase in the trade of the district; but a period of depression had set in, during which time the promoters alleged a great increase in the quantity of water pumped. There must, therefore, be a mistake somewhere. With regard to the justification of the means suggested for a further supply, he was obliged to criticize somewhat closely the evidence of Mr. Hawksley, who was the mouthpiece of the company. One witness had declared that the water was thicker than beer, which conveyed a clearer notion of what it must be than the decimals of the scientific witnesses. If 200,000 gallons of sewage were put into the river above the intake, when the summer flow was 26 million gallons, that gave a 130th part of the river as being sewage. Mr. Hawksley and Dr. Letheby said that was an inappreciable quantity. The feasibility of a gravitation scheme had been clearly shown by the evidence called on the part of the petitioners. Yet Mr. Hawksley had not taken the trouble to go up the valleys for the purpose of seeing whether the water could be profitably impounded during floods to be given out in dry weather. Mr. Hawksley had said there would be no difficulty in making the storeage reservoirs, but that it would cost £2,000,000, and would involve a heavy charge upon the ironmasters. But he also said that, at present, the company got the water so cheaply that they could afford to let the ironmasters have it at 3d. per 1000 gallons. Evidence on the part of the petitioners showed that Mr. Hawksley's estimate was excessive. It had been shown that there was an abundant supply of unpolluted water to be found in those upper valleys and that it could be impounded at a small cost. He contended that the flow of water had been over-estimated by the company's surveyors, who took their estimate from the quantity running in March and April. If the company were allowed all the water they wished to take, the river would be unduly polluted by sewage. He then came to the question of the scour of the channel. The commissioners had spent £300,000 in improving the channel, and it was cruel that this company, for its own profit, should be allowed to take away the land flow on which the commissioners depended for the scour of the bed of the river. As a whole, the bill was a fine specimen of the cheap and nasty. It was unsupported by public evidence, and looking at the magnitude of the interests involved, and at the inconvenience and damage that would be done if it became law, he thought he was entitled to press most earnestly upon the committee the duty of not passing such a bill as this.

Mr. SOMERSET, replying on behalf of the promoters, said that on the same ground of public policy he should ask the committee to pass the bill. A more unfounded attack on Mr. Hawksley had never been made, and it should not rest there. As to the witnesses on the other side, he believed them to be honestly mistaken. He now had the original resolution of the Darlington Rural Sanitary Authority withdrawing their opposition to this bill, although the chairman of the board said he had not heard of it being passed, and the committee said they would take the reference to it *quantum valeat*. As to Mr. Hawksley having, in 1864, given an area of 500 miles, no question on it was put in the present committee, although one was suggested and then withdrawn. He objected to Mr. Dodds being taken as representing any one except himself. With the exception of the professional witnesses no one had been examined except members of the Corporation of Stockton and Middlesbrough. He asked whether the evidence did not make out a public case for the passing of the preamble. The company sought to increase their works and their limit of supply; and they asked to repeal clause 9 of the Act of 1864, so as to be enabled to take a further supply of water from the river Tees, and on that proposal the contest had really arisen. The company were bound to supply certain manufacturers at 3d. per 1000 gallons, but nothing was proposed as to relieving the company from that obligation; and when Mr. Dodds said the ironmasters would pay any reasonable price for water by a gravitation scheme, he spoke only for himself. In 1864 Mr. Dodds objected to the company's bill without some limitation, and he was beaten in the House of Commons; but went to the Lords. Mr. Hawksley denied the company were compelled to put in the clause limiting the quantity to be taken to 60 million gallons per week, but said that Lord Redesdale required it, and he agreed to it after some discussion. Mr. Hawksley had fully described the circumstances under which the quantity was settled, and Mr. Dodds, in his evidence, did not contradict Mr. Hawksley, although his petition did. He said, however, that it was due to the opposition to the bill that the clause was inserted. Charges of inaccuracy had been made against Mr. Hawksley; but, so far as he had seen, he (Mr. Somerset) wondered at Mr. Hawksley's wonderful accuracy year after year. He now came to the merits of the case. The Tees had been allowed by Parliament as the source of supply at various times since 1851. in 1864 the amount of water taken was 13 million gallons per week, and that had increased in 1875 to 55 million gallons. Therefore, with such a rapid rate of increase, further powers were absolutely necessary. The assertion that there must have been a mistake in the calculation of the increase, owing to some furnaces having been blown out, was unfounded, for the returns were taken from the books by the managing directors. The limit of supply had been reached, and something must be done, or the progress of the district would be limited, as water was essential to its progress. If limited, then it would probably diminish, for trade always either progressed or declined. The Darlington sewage would shortly disappear from the Tees, for it was idle to suppose that it would be withdrawn from the Skerne, only to be conveyed three or four miles further away before discharging it into the Tees. If it was feared that the river might be pumped dry, let Parliament limit the company to 120 million gallons, and then in 15 or 16 years they would come back again and see what was best to be done. That would be thought a fair solution of the matter. The probable increase of the population and trade in the next few years was not disputed by the other side, but the question arose, where was the water to come from? and Mr. Hawksley told them that it could only be obtained from the river Tees, which had a drainage area of 331 square miles above the pumping station. The population above, draining directly into the river, was 10,500 even on the calculation of the Stockton Borough Surveyor, and that was a very small proportion of sewage to go into such a volume of water. Then, as to the opposition of Middlesbrough, there was nothing complained of which could not be met by clauses in the bill, and the witnesses from that place generally gave the company a good character. Mr. Surtees's opposition was also a question of clauses, and some of the other petitions might be taken as one. But the great opposition was that of Middlesbrough, which desired to supply itself with water; and the contention was that if this bill passed it would be more difficult to purchase the company's works. As to the Dinsdale dam, an inquiry was about to be held on the spot, to decide as to the removal of the weir on purchase by the commissioners, and whatever injury

there might be by the abstraction of water could be met by a compensation clause, if the general Act was not sufficient. Of the 100 miles of riparian owners, only 18½ miles were found represented in the petitions, and of those the most part only feared what might be done in the future. As to the bed of the river having changed, that was due to the floods rather than to any abstraction of water; and it was acknowledged that the fish had increased in the river, notwithstanding poaching and poisoning. The pipe across the Tees was not for the convenience of the company, but to give a duplicate supply to Stockton, at a cost of £10,000. The question of its interference with the highways was one of clauses, but that of the purity of the water was of great importance. On this point he would refer to the strong evidence of the scientific witnesses that it was a fit and proper supply. Dr. Letheby declared it was most excellent water, and one of the best in England. With respect to poison germs, no one had seen them who had been called, and Dr. Letheby, the highest authority on water supply, did not believe in them. As to the samples of water, he would like to know why the opposition had not produced specimens of the water, which was said to be thicker than beer, as the promoters had produced samples of what they declared was pure water, together with water from which the peat stain could not be extracted. Against this the opposition had only set up a theory, when it was in their power to submit an analysis from water taken at Middlesbrough and Stockton, if it had been so bad as they asserted. As to the pollution below the intake, he hoped the corporations at the mouth of the river would be obliged to keep their sewage out. The law was such that they could be forced to do it to-morrow—and he hoped some one would do it—but while they drained into the river they could not come with a good grace to prevent the company getting their bill on the ground that it would prevent the pollution being washed away.

FRIDAY, MAY 7.

Mr. SOMERSET continued his reply on behalf of the promoters, submitting that the good quality of the water had been sufficiently established. Dr. Ellerton and and Dr. Farquharson had told the committee that no outbreak of disease at Barnard Castle had injuriously affected Stockton or Middlesbrough; and no evidence had been called to show they were mistaken. Nor had any medical evidence been called to connect any disease in that district with the water supply. Coming to the question of filtration, he submitted that the witnesses for the opposition did not agree about it; but allowing that the filtration was insufficient, it showed the greater necessity for this bill being passed; if the company had more money, they would make more filter-beds. As to the gravitation schemes, the cost of the works referred to was totally outside of legal and service expenses. Weardale was not a case in point, as they had not iron-works to supply, and they had to bring the water only ten miles. Although Mr. Hawksley gave 45 million gallons as the flow, that was the minimum, and in flood times it was often as much as 200 million gallons. Mr. Powell, a gentleman who held a Government appointment, had been sent down, and calculated the ordinary dry-weather flow at 70 million gallons. A more trustworthy source of information could not possibly be had. He should not go into the gravitation scheme, as Mr. Hawksley said it could not be made under £2,000,000. Mr. Bramwell said it would cost from 7d. to 1s. per 1000 gallons to the consumer, and other difficulties would arise with landowners; for the brooks referred to flowed through the parks of gentlemen and noblemen in the vicinity. With regard to the scour, a good deal had been said about those reservoirs; but the scours came from the floods, and if those impounding reservoirs were built there would be a smaller scour. The large floods could not be caught, even by the reservoirs of 5000 million gallons; but the dry-weather flow was caught, and the freshets which were necessary for the river were caught. As at present worked, the company's intake had no appreciable effect upon the scour. The great reason for the Middlesbrough Corporation opposing the bill was, that it would prevent them from purchasing the works; and he asked the committee to give the company the power for obtaining money, works, and lands, which might be required. If the committee thought that they should take less than 120 million gallons per week, they would be content that the limitation should be made. Apologizing for the length of time he had taken to answer the six cases in opposition, the learned counsel concluded by appealing to the committee to pass the preamble of the bill.

The room was then cleared, and, on the readmission of the public,

The CHAIRMAN said: The committee are unanimously of opinion that the preamble of the bill has not been proved.

Mr. MICHAEL applied for costs on behalf of Mr. Surtees, which were refused.

Mr. SOMERSET said he was perfectly certain the committee had done justice, although they differed from the views he held, but he would ask whether they had come to any special determination as to the money to be raised. The evidence showed that the company were simply without money, and if they wished for any further evidence on the point he had it in the room. They asked in the bill to raise £350,000, with corresponding borrowing powers, and they really could not go on without money.

The committee having again consulted in private,

The CHAIRMAN said: The committee consider that in refusing to pass the preamble of the bill they have refused the application of the learned counsel.

Miscellaneous News.

BRITISH ASSOCIATION OF GAS MANAGERS.

(*Continued from page* 944.)

WEDNESDAY, JUNE 9.

At the close of the sitting yesterday afternoon, Mr. S. H. WARREN (Crewe) read the following paper on

MECHANICAL STOKING.

The subject of mechanical stoking, as applicable to gas-retorts, has lately attracted much attention, owing, I suppose, to the labour difficulties of the past two years; and the introduction of a successful machine is looked forward to by many, not only as a source of relief from the trouble and anxiety which these difficulties cause, but also as a release for their men from a hot and brutalizing labour, and a wearing out of steel and iron rather than of flesh and blood.

As I have devoted much time during the past year to the invention and construction of a stoking machine, the model of which is now before you, and which I shall presently have the pleasure of explaining to you, I have naturally been led to the investigation of the conditions essential to success in any machine, and as I think a direct personal interest in a question of this kind is eminently calculated to ensure an extended knowledge of the subject, and of the difficulties to be encountered and overcome, I have ventured to call your attention to the matter, and to give you, as far as I am able, the results of my work and inquiry.

I have confined my attention entirely to machines other than continuous acting; that is, to such as are quite independent of the retorts, travelling in front of them. These may be conveniently divided into two distinct groups, the one comprising all those in which the greater part of the machine consists of a carriage travelling into and out of the retorts, and carrying the rakes and scoops, being itself mounted on a main platform, moving longitudinally. This arrangement possesses the great advantage that the rake, or discharging tool, is always under the immediate control of the attendant, and need only be about one-half the length of those under the second group. The great objection to this plan, however, is that the greater part of the whole weight of the machine —especially if, as in Darlington and Scott's machine, the boiler and engine move with it—is in the carriage, and that, as they travel into and out of the retorts, is from 20 to 30 times greater than the longitudinal motion, the greatest weight is moving through the longest distance, and the power required thereby very greatly increased. As Mr. Livesey remarked in his presidential address last year, the power needed to work a machine is almost necessarily excessive, when it is considered that one man can draw a retort; and, although it must be remembered, in considering the power expended, that it is not the work of one man only, but of 12 or 15, that a machine does, yet every means should be taken to reduce the power requisite within the narrowest possible limits. I concluded, therefore, that the bulk of the weight should be so arranged as to move longitudinally, while only the tools themselves move towards and from the retorts. This object is accomplished in the machines of the second class, to which belong Foulis's, Somerville and Robinson's, and the one which I am now bringing under your notice.

With the exception of the machines of Messrs. Holden and Foulis, all derive their motive power from an engine and boiler, either fixed upon the machine—as in Somerville and Robinson's, Macfarlane's, and Darlington and Scott's—or attached to it, but moving separately, as in Rowland's. The carrying and moving of such a boiler necessarily adds very greatly to the weight and cumbrous appearance of the machines, especially when, to work a double house, the charger and drawer being separate from each other, four such boilers and engines are needed. I could but regard this as the great obstacle in the way of success, and, seeing some cranes working by means of frictional contact with a high-speed rope, I was immediately impressed with the idea that this was a means of overcoming this great difficulty; and, having the motive power put into my hands, I immediately set about designing a machine to which to apply it.

It appeared to me that it was absolutely essential that a machine should be applicable to any existing settings of retorts, and, therefore, that only one scoop should be used, which must be adjustable to any level. As I also deem it important that the rake should be held by the attendant, and guided by him, this was an additional reason for discarding what I may call the multiple system. As, when the scoop or rake is once fixed at any level, all the retorts at that level can be charged, the number of times it needs adjustment is very few, and the distance it has to travel being very small, the power thus expended may, for practical purposes, be almost disregarded.

In the machines of Mr. Macfarlane and of Messrs. Taylor, Chadwick, and Buckley, a combined scoop and rake are used, the rake-head being attached to the moveable bottom of a scoop, and, as the coke is withdrawn, the coal deposited behind it. Now, in the present retorts, there certainly is not sufficient room for a scoop to pass between the surface of the coke to be withdrawn and the roof of the retort. I think, therefore, that such a plan is quite impracticable, but I thought that, if the retort were open at both ends, and not very long, a head might be fixed to the scoop, and the coke pushed out before it, in a manner similar to that which Mr. West adopts for his light charges. Upon experiment, however, I found that it would be quite impossible thus to thrust out the charge of an ordinary retort, owing to the "jamming" of the coke, and concluded that the scoop and rake should be separate, and that the more nearly they resembled in their action those now used in manual labour, the more perfect would be their performance.

In most of the machines the charging is done by a separate apparatus from that used for discharging, and as, by thus dividing them, both can work simultaneously, double the number of retorts per hour can be operated upon. There is, however, the drawback that, as the machines cannot pass each other, a space at each end of the house, equal to the width of each machine, must either be left unoccupied, or the retorts built upon it worked by hand. I purpose, then, to combine the machines, but to use two of them, where the retort-house is large enough to require it, reserving one machine for charging exclusively, and the other for drawing, except at the ends, where one machine will do both, and, as they are very narrow, no room will be lost. The risk of breakdown is also reduced by one-half, as, if the charger of the one machine became out of order, the other could occupy its place, it doing the discharging; or, if one entirely broke down, the other would remain a complete machine, able to work one-half the house, or, at a pinch, perhaps more. Two machines, working in this manner, would be fully equal to the work of one of the large houses of 30 benches at Beckton, while a single machine would suffice for a house of from 15 to 20 benches of seven retorts each.

The liability of the coke to "jam," or become fixed in the mouth of a retort, if too much be laid hold of at once, renders it necessary that power of instant reversal or stoppage should be provided, and also that the moving parts should not be so heavy as to acquire much momentum, and thus render the stoppage of the driving power ineffectual to prevent damage to the retort.

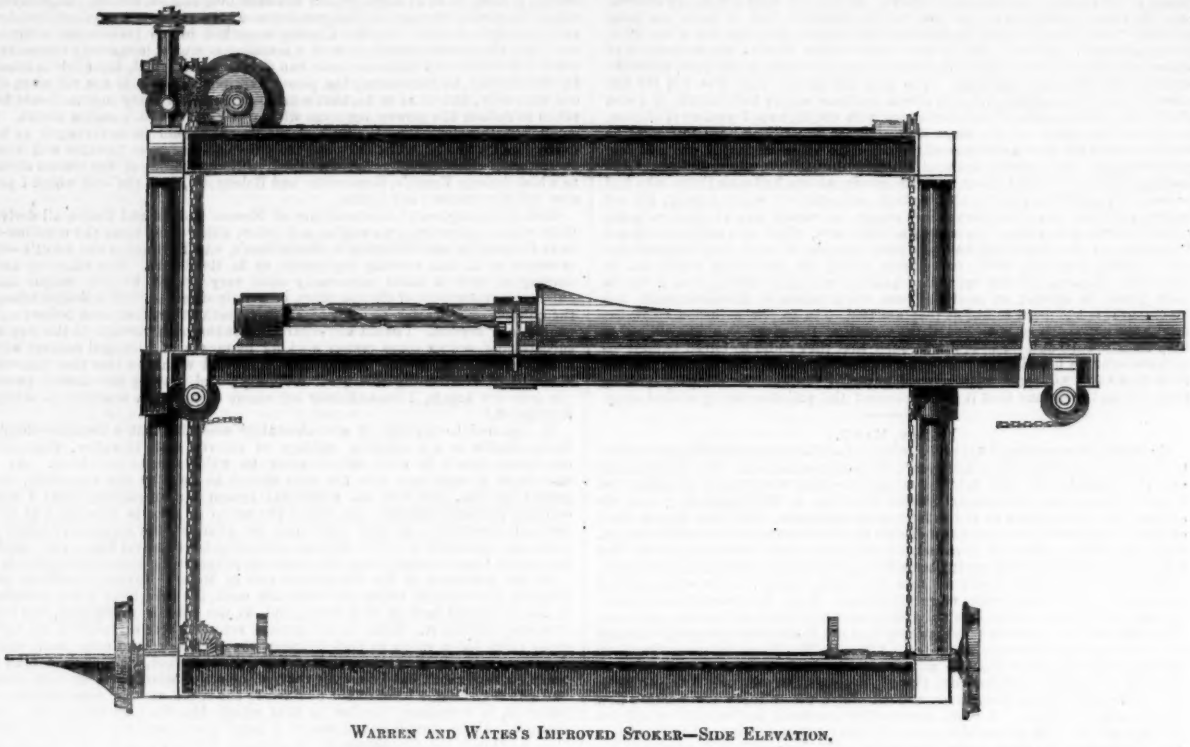
There may be other equally important requirements that I have failed to perceive, but those which I have named I believe to be essential, and I shall summarize them thus:—1. That the machine be light and compact, and the weight so distributed as to travel the least possible distance. 2. That the motive power be applicable from a stationary engine. 3. That the machine be applicable to any existing settings. 4. That it be as narrow as possible, to avoid loss of space. 5. That the rakes be under manual control and guidance, and so light as to avoid danger from their momentum. 6. That the whole of the working parts be simple of construction, not liable to get out of order, and easily accessible, in case of accident, for replacement by duplicates, and that all such parts be made to gauge.

As the number of machines for which patents have been secured is not very considerable, I shall endeavour to point out some of their principal characteristics, and to inquire how far they comply with the conditions I have endeavoured to formulate.

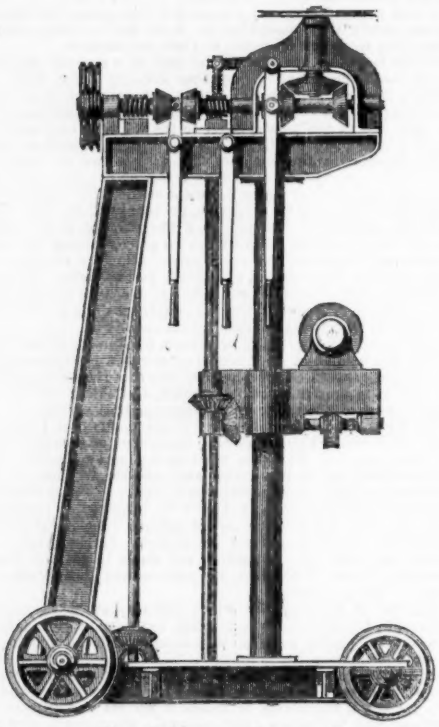
The first patent for a stoking machine of which I can find any record was taken out by Mr. Henry Green, of Bolton, in 1860. The scoops and rakes are moved into and out of the retorts by means of screws and nuts, in a manner almost identical with that which I have adopted. The motive power is intended to be applied, however, from a square shaft, extending the entire length of the retort-house, and carrying a spur-wheel, moveable upon it, and held between brackets upon the machine. This spur-wheel gears into one on the main driving-shaft of the machine, and thus communicates its motion to it. As this wheel must be able to move to any position on its shaft, according to the part of the house the machine occupies, it is evident that in a tolerably large house it would be, unless supported by tumbling brackets, which would be awkward, quite unable to maintain its own weight.

Although I think, on this and other accounts, that the arrangement indicated upon the drawings is impracticable, I can but acknowledge that Mr. Green anticipated me by 15 years in some of the most prominent features of our machine, and that, although both Mr. Wates and I were ignorant, until very recently, of its existence even, if any merit attach to it, a share belongs to him.

With the exception of Best and Holden's first patent in 1865, and one for a hand-power machine in 1868, no other patents were obtained until Holden's second in 1870. This machine was, I believe, erected at Beckton, and proved unsuccessful; many of you, no doubt, saw it at work when this association met in London in 1872. It was built upon what I have described as the first principle, and is open to all the objections inherent to it. The scoops are supported by a headstock at the side, and have a circular adjustment, so that they can be swung into a position at right angles with the retorts, and thus brought under a hopper, containing coal, travelling upon a line of rails behind those upon which the machine moves. The scoops being filled, are again swung into a line with the retorts, and the carriage to which they are attached set in



WARREN AND WATES'S IMPROVED STOKER—SIDE ELEVATION.



WARREN AND WATES'S IMPROVED STOKER—END ELEVATION.

motion by a wheel and endless pitch chains upon the main platform. When in the retorts, the scoops are turned over by means of a counterbalance weight, which is released by the removal of a detent; this counterbalance is again brought into action by being made to ascend an inclined plane at the reverse end. The rakes are furnished with moveable heads, which are controlled by a lever held by the attendant, and can, when entering the retort, be elevated into a line with the rake-bar, and depressed, so as to grip the coke upon being withdrawn. The exceedingly cumbrous and complicated character of the machine are sufficient, I think, to account for its lack of success.

The next in order of date is that of Mr. Macfarlane, of Manchester. It is on somewhat the same principle as the last, consisting of a platform and traverser, which latter is, however, moved by a horizontal screw. An endeavour is also made to combine the rake and scoop, which has been previously referred to. The power is obtained from a boiler and engine on the travelling platform.

In the same year Messrs. Robinson and Somerville obtained their first patent. The machine was erected at the Alliance Gas-Works, Dublin, I believe with some share of success. It certainly avoids what I regard as the chief defects of its predecessors, as it is constructed upon the second principle, only the scoop and rake moving. But one scoop is used, which can be adjusted in the main frame to any height, thus rendering the machine applicable to any form of setting. An engine and boiler on the machines furnish the requisite power, and motion is imparted to the scoop and rake by chains wound upon drums. The chief drawback to its being more perfectly successful lies, I think, in its having to carry boilers and engines.

No further patents were applied for until 1873. Early in this year Mr. Foulis obtained his patent for a hydraulic machine—unquestionably the best hitherto introduced. You are all acquainted with it from the drawings which appeared in the JOURNAL OF GAS LIGHTING, and I shall not attempt to criticize it, except to say that, in designing the machine, Mr. Foulis seems to have considered every point I have mentioned as essential, and met the difficulties arising from them with great ingenuity. Seven other machines were also patented—one by Messrs. Taylor and Chadwick, of Oldham, which, I believe, owing probably to the death of Mr. Taylor, was never actually built; a second by Mr. Richards, which very much resembles Messrs. Somerville and Robinson's; and a very elaborate one by an American, named Rowland, models of which were for a long time exhibited in London. Mr. Robinson and Messrs. Somerville and Robinson also obtained further patents. The most original, however, is that of a Mr. Manwell, who, having filled his scoop, elevates it upon an inclined plane, down which it runs, upon being liberated, towards the mouth of the retorts, where it is suddenly stopped against a spring buffer, and the coal discharged into the retort by the momemtum acquired. The last in this year is that of Messrs. Darlington already referred to, and of which illustrations lately appeared in the JOURNAL OF GAS LIGHTING.

In 1874 Messrs. Foulis and Robinson obtained further protection. Mr. Warner, of South Shields, patented an arrangement of retorts set in a hollow circle, the centre of which is occupied by a machine combining both rake and scoop, consisting of a scoop double the length of the retorts, the back part of which is filled with coal, and then thrust into the retort; the front half of the scoop carries out all the coke in it, and upon its being reversed, the coke is deposited on the floor of the house, outside the circle, the coal in the retorts. In the same year Mr. Wates and I patented the machine I shall now describe.

It consists of a stout frame travelling to and fro on a line of rails, and carrying within it a table or platform, supporting the rake and scoop, and capable of being raised by the screws to any level. The weight will not exceed 1½ ton, nor the gross width 5 feet, the scoop and rake *only* move transversely. The motive power is obtained by bringing the large driving-wheel in contact with a ⅝-inch cotton rope, which is travelled at a speed of a mile a minute, by a stationary engine fixed in some convenient position. As this rope is carried all round the house, it drives any number of machines on either or both sides of the house, whatever may be its size. The wheel has, according to the relative dimensions I have adopted, a speed of 1000 revolutions, which it imparts, through the friction cones, to the shaft and grooved friction-wheel in either direction, depending upon which of the friction cones is in contact. This grooved pinion gears in a corresponding wheel, of double its diameter, upon the main driving-shaft of the machine, which carries three mitre-wheels, gearing into corresponding wheels upon three upright shafts, which impart motion respectively to the rake, scoop, and moveable table, and which are thrown into or out of gear by two double friction clutches. One of the clutches also imparts motion to a worm, worm-wheel, and shaft, and thence to the wheels of the machine, moving it in either direction as a whole. The rake is a bar moved by being attached to a nut, working on a screw extending the entire length of the table, and is governed by a second bar, working on a fixed fulcrum, held by the attendant. The scoop is propelled in like manner, and is turned over by a screw on its handle, or headstock, working in a fixed collar. The reversing of the scoop is quite automatic, and automatic gear is likewise arranged to cause the return motion of both scoop and rake, and to stop them at the end of their return. The model is, however, before you, and I need not enter into a necessarily imperfect verbal description, when you can see it in actual working at your leisure. Every part is intended to be made to gauge, and, as far as possible, interchangeable with each other. The power of reversal or stoppage is, as you will see, instantaneous, and there being so many frictional parts, renders breakage by sudden shock a very remote probability. The speed designed to be given to both rake and scoop is about 120 feet per minute, and that to the whole machine, when moving to and fro, about 75 feet. That of the adjustable table in the model is 50 feet; it will, however, be reduced to one-fourth, or thereabouts, as it has so seldom to be moved that a high speed is of little advantage, and so great an increase to the power necessary to drive it at a high speed is undesirable. The power actually used in the machine will not exceed one-third horse, I think, for any operation, although the power required to move the rope will cause a considerably greater, though still moderate, expenditure.

The drawings show a modified and improved form of machine. In this the driving screws are replaced by chains, and as a low speed will thereby be

required, the vertical shaft is driven by a worm and wheel instead of by toothed wheels. The friction cones and shaft run at 1600 revolutions a minute, and the vertical shaft driving the bevel wheels and chain shaft runs at 80; eight revolutions put the scoop into the retort, and a simple automatic gear, consisting of a screw having eight threads, which acts upon a lever attached to the friction cones, reverses and stops the scoop respectively at the end of its travel into and out of the retort. A second worm drives the vertical shaft to the left, and by spur and bevel gearing at the bottom moves the machine in either direction, according to which friction cone is in gear. At the end of the shaft is a 6-inch grooved wheel, or spur-wheel, gearing into a 12-inch, on a shaft at the back, upon which, actuated by the central handle, is a worm and clutch driving a worm-wheel and horizontal shaft, to which are attached a pair of Weston's block chain-wheels to lift or lower the platform; a second worm and horizontal shaft can be used to lift the coals into the scoop.

A very slight modification will be suitable for a combined machine. The advantage of this form over the one shown in the model is its much greater simplicity and cheapness, that it allows the scoop to be on the outside clear of the frame so as to be readily filled, and that the driving vertical shaft being at the side, does not interfere with the free motion of the rake, and the low speeds greatly reduce the wear and tear. The automatic gear, also, is very simple, and quite out of the way. But three handles are required to obtain all the motions—ten in number—and a fourth will suffice for the combined machine, and they are all within easy reach at the front. To drive the rope I propose to use about a 5 horse-power Brotherhood and Hardingham's new three cylinder engine, fixed in the wall of the house at the gable end, having a 5-feet wheel in its axle driving the rope. The engine will run at 350 revolutions a minute, and the rope, consequently, at about a mile per minute. One rope passing quite round the house would suffice to drive both sides; to reduce risk of breakage, however, I would prefer using two ropes. By having two grooves in the wheel, the same engine would drive both.

The advantages to be gained by the employment of this or any machine are almost entirely confined to economy of labour and relief from the difficulties of obtaining and managing the skilled labour now requisite. Some incidental gain may, however, exist in the shape of economy of fuel account, owing to the retorts being exposed for a shorter time, and economy of space and wear and tear, owing to the same cause, each retort only being idle for a minute or two for recharging. The retorts may also be set to a higher level, in four or five tiers, as the table with the scoops and rakes is adjustable to any height. The gain, however, on carbonizing labour must be considerable—not less, I estimate, than 50 per cent. on present carbonizing wages, or from 1½d. to 2d. per 1000 cubic feet. A retort-house of 30 benches, of seven retorts each, requires at least 24 stokers, besides wheelers and firemen; as these latter, however, are still necessary, if machines are used, they may be disregarded. Two machines would be necessary for such a house, employing eight men, for the 24 hours, or but one-third the former number; when fuel and wear and tear are taken into account, and the men common to both included, this will be reduced, as I have said, to about 50 per cent. of present rates. It is, however, well known that the results anticipated upon the introduction of a new system are usually far exceeded in importance by those not foreseen, and I have no doubt advantages will be found to arise from a general adoption of machine stoking, which we cannot now perceive to be probable, and most likely disadvantages will not be lacking. The introduction of machinery has hitherto been uniformly conducive to the wealth of the manufacturer and the community, and to the happiness and comfort of the labourer in the end; nor is gas stoking likely to form an exception to the rule. It is one of the hardest and hottest of labours wherein machinery is still unemployed. Puddling promises fairly, I believe, although hitherto scarcely successfully grappled with to be shortly overcome; and, surely, gas engineers are not to have the discredit of being the last to apply machinery to the performance of their heavy work. Thus far, certainly, the utmost has been done, for every machine brought forward having any signs of likelihood of proving successful has received a fair trial. This one, I believe, will shortly be at work; and, possessing the sanguine spirit proverbially belonging to inventors, I hope at our next meeting to be able to tell you of our success.

The discussion on the paper was postponed till this morning, when

Mr. WEST (Maidstone) was called upon by the president. He said he had no comments to make upon Mr. Warren's apparatus. No doubt, when it got into practical working, Mr. Warren would find out the advantages and disadvantages of his machine. At the last meeting of the association, it would be remembered that he (Mr. West) read a paper on the apparatus for mechanical stoking which he had himself invented. He then produced statements of facts which he had up to that time worked out, and stated that he believed by his system there would be an increase in the volume of gas obtained, equal to about 10 per cent. On that occasion some members of the association raised objections as to the quality of the coke produced, and this showed the importance and value of discussions of this kind. He (Mr. West) thereupon took the matter into consideration, and was afterwards convinced that it would be desirable to manufacture, if possible, a denser coke. Accordingly, he rearranged his machine so that he could obtain a thicker layer of coal, and having got his apparatus to work again, he found that he was able to produce a really good coke. But in doing it he also found there would be a decrease in volume of gas. He then made experiments with 14 D retorts, and found that he had an increased volume of gas of 5 per cent. with very good coke, increased also in volume 10 per cent., for sale. The experiments were prolonged, and he found that, satisfactory as were the results as respected the increased volume of gas and the denser coke produced, there was a loss of time—*i.e.*, he was longer in distilling the coal—and there was a loss of heat in opening the mouthpieces at each end, and in radiation from those mouthpieces. Several friends had been to see the apparatus, and not one of them suggested there would be any loss; he was, therefore, somewhat disappointed when he found that such a loss of heat arose, and that it would be impossible to work off the proper quantity of coal in time, so as to bring the thing into practical operation for the public service. Having, however, great confidence in the charging apparatus, he considered it advisable to see what means could be devised for drawing the coke, and he was now pleased to say that he had been successful in producing a rake that answered admirably the required purpose. The new arrangement had been at work for a considerable time, and was still working. But his friends, especially Mr. Hartley, who had tested the apparatus and obtained good results, considered it would be desirable, seeing that he was preparing some new benches, to apply the system to the supply of the whole of the gas manufactured for the town. Accordingly, as soon as he could complete his arrangements, he determined to do this, and began to work with 35 retorts about six weeks ago. The mode of procedure was this. First of all, to get a standard of comparison, he charged them with the scoop, and drew them with the rake on the old plan. After that they were charged entirely with the machine on his system. Unfortunately, just as they were about to commence these experiments, an agitation was got up in Maidstone, and the local authorities were anxious to purchase the company's works. Desirous, under such circumstances, that the gas supplied to the town should not be below the standard, he worked with lower heats than usual, and the consequence was that he could not get the results of the working of the system so favourable as he otherwise might have done. He tested the results first of all on the old system with 200 tons of coal, and afterwards on the new system; and he found there was an increase in the latter of 4 per cent. in the volume of gas with an excellent coke, and all other conditions good. The increased quantity of coke for sale was equal to 10 per cent. upon the old system. The time for charging and discharging the retorts was very short indeed—the men drew and charged a retort in less than one minute. The whole of the gas supplied to Maidstone was made on his system, and had been so made for the last six weeks. It was, therefore, now being practically tested. He was anxious that there should be a prolonged working trial of it, and he would be much pleased to give the results on a future occasion. Meantime, if any of the members of the association would go to Maidstone, they would have the opportunity of judging for themselves. His men did not want to go back to the hand-scoop charging. The rake employed was a very simple one, and it passed over the coke, bringing it all out at once.

Mr. GIBSON (a visitor) asked permission to offer a few remarks. He said several of his friends believed that the Steam Stoker Company, whose machines were exhibited in Edinburgh two years ago, was defunct; and there had recently been a statement in the JOURNAL OF GAS LIGHTING that the original steam stoker was virtually exploded. He wished, therefore, to inform the members of the association that such was not the case, and that, on the contrary, the company had erected their apparatus at the gas-works of the Salford Corporation, where it had been in operation continuously for five weeks, drawing and charging at the rate of a retort per minute. Any of the members who would like to see it at work would, no doubt, obtain Mr. Hall's permission to do so. That one machine was equal to drawing and charging 540 retorts at the rate he had just mentioned.

Mr. HARTLEY (Westminster) said he should like to say a word or two in support of his friend Mr. West, with whom he had been associated in carrying out the experiments with his simple and effective apparatus. It was an unfortunate fact, as stated by Mr. West, that a diminution of temperature did take place when working on his original plan; and this led to the consideration of a question of great importance to gas manufacturers—viz., the use of retorts with mouthpieces or lids at both ends. Certainly, the radiation from the back lid was serious in its effects upon the retort, altogether apart from the effects of the lid being removed frequently. The result of the discovery was to lead to the construction by Mr. West of the arrangement to which he had referred, which was certainly very simple in its nature, very easily handled, and productive of very good effects. Having been to Maidstone and seen the whole working, he (Mr. Hartley) was enabled to say that Mr. West had used the utmost precaution to avoid the possibility of any misapprehension of facts. The coals were carefully weighed, the coke carefully measured, and he (Mr. Hartley) could vouch for it that the statement of the amount of coke for sale was based on the absolute sale from the retort-house. He said thus much because Mr. West, he thought, had not so favourably put his own case as he might have done had he felt at liberty to trespass longer on the time of the meeting.

Mr. KING (Wolverton) said he was sorry that Mr. Warren's paper had been read at a time when there was "a count-out" in the meeting on the previous day. There appeared to be not so much difficulty in "making a house" as in "keeping" one. The result, on this occasion, was that the discussion was not confined to the paper out of which it was supposed to arise. It seemed to him that, in the invention and arrangement of apparatus now placed before the association in its modified form, as shown in the drawings, there was much that was highly worth the attention of the members. He was sorry that Mr. Warren had not time more fully to describe the motive power, which gave him the idea of working his arrangement for charging and discharging retorts. To those who, like him (Mr. King), had been privileged to see its operation at the Crewe works of the London and North-Western Railway, it would be at once manifest how admirably adapted it was to a thing of this kind. He believed Mr. Warren's apparatus might be worked at a limited cost, and that while it was economical it would also be effective.

Mr. CRAVEN (Dewsbury) said he thought that any steam stoker which required that the coal should be carried to it was defective in arrangement. He should like some information as to the cost of labour when steam stoking was employed, as compared with manual labour, in drawing and charging retorts.

Mr. ELDRIDGE (Richmond) asked whether the same engine which worked the machine up and down the retort-house also worked the scoop and rake.

Mr. WARREN, in reply, said, in reference to the observations made by Mr. West, that he did not pretend to any advantage in the quantity of gas produced by the use of his machine. Its value was exclusively in the drawing and charging of retorts in substitution of manual labour. If there was any value in it with regard to the increase in volume of gas, or in its illuminating power, that must arise entirely from the rapidity with which, by its employment, the retorts could be drawn and charged, and the slight gain in the increase of heat. He was much obliged to Mr. King for the remarks he had made. With reference to the filling of the scoops, he might say that he had arranged a plan on the model which he found did not act so well as he expected, and therefore removed it. He had several plans in his mind for the purpose, but had not had time to test their capabilities since receiving the model. One was a hopper on the top, with an archimedian screw, delivering the coal to the far end, and which, with the scoop, went into the retort and filled it. There was a screw at the back, at present unemployed, which would drive an archimedian screw or work a crane into the retorts. Or, in houses that were so wide that the coal could be dropped at the side of the house, the scoop might be made to turn on a swivel. As to Mr. Eldridge's question, he remarked that where the motive power was on the machine it could only drive it up and down, but here any possible movement could be obtained. In reference to the question of relative cost, he was not prepared to go into that, as the machine was not in action; but he believed, from estimates he had made, that it would be a reduction, in favour of the working by machinery, of 50 per cent. He did not think the relative cost per 1000 cubic feet was the chief question. If the cost, indeed, were not reduced at all—if the use of the machine cost as much as manual labour—the advantage of reducing the number of men now employed in an occupation of a brutalizing character was no mean consideration in the management of gas-works.

The PRESIDENT said he thought there was no observation that he need make. Mr. Warren had clearly answered the inquiries addressed to him. So far as his own judgment would lead him, it was favourable to the machine now brought before the association. It was simple in its arrangement, and appeared to be one that very likely would be brought into general use, provided it was not encumbered with heavy royalties, which, in many cases, seriously interfered with the adoption of useful inventions.

[We are sorry to say that the pressure on our space prevents us from giving more of the proceedings this week.—ED. J. G. L.]

THE INSTITUTION OF CIVIL ENGINEERS.—The list of members belonging to this society has just been corrected to Midsummer-day, and shows an increase in the last three months of 1 honorary member, 12 members, 40 associates, and 20 students, the numbers of these several classes being now 16, 832, 1463, and 333; making together 2644 of all grades.

THEFT OF GAS AT PERTH.—On the 16th inst., Archibald Menzies was brought before Bailie Robertson, at the Perth Police Court, charged with stealing gas. It appears that the pipe which supplies the other occupants of the land passes along Menzies kitchen, and is only about 1½ inch from the pipe supplying Menzies own house. Between these two pipes a small piece of tubing was inserted, which allowed the accused to burn gas without passing through his meter. The presiding magistrate said that, although this was a most serious offence, the commissioners in this case had not been defrauded to a very great extent, and he imposed a fine of 20s., with the alternative of ten days imprisonment. The fine was paid.

PERTH GAS COMMISSION.

The Annual General Meeting of the Commissioners was held on the 14th inst.—Lord Provost M'Donald in the chair.

The following balance-sheet was presented:—

Balance of the Perth Gas Commissioners Books, as at April 30, 1875.

Assets.				Debts.			
Gas establishment—cost price	£45,000	0	0	Gas annuitants for amount of their several holdings in the Perth Gas Annuities	£45,000	0	0
Preliminary and parliamentary expenses	2,483	4	1	Borrowed money and interest thereon	11,218	3	4
Alterations and improvements on works	6,411	12	5	Annuities (including half year to Whitsunday, 1875)	1,403	3	2
Stores, tools, and sundries	1,071	8	8	Salaries—balance due thereon	183	10	0
Coal account—stock on hand	15	9	10	Interest on purchase price of naptha yard	6	0	0
Lime account	15	15	0	Contingency and depreciation of works fund	100	0	0
Arrears of gas-rental, less sum at credit of bad debt account	1,558	5	4	Revenue account—balance thereon	1,975	19	2
Naphtha work—stock on hand and accounts outstanding	139	0	0				
Arrears of tar and coke	51	7	1				
Property investment	709	1	3				
Rent of property	23	0	0				
Bank of Scotland—account current	1,901	8	5				
Ditto ditto—deposit account	2,002	1	1				
Cash account—on hand	5	2	6				
	£61,386	15	8		£61,386	15	8

The report of Mr. James Morison, the auditor, pointed out that a comparative view of the revenue and expenditure for the past two years shows a much more satisfactory result than that exhibited by a similar comparison at this time last year, the difference being upwards of £1200 to the good. He further observes that the books have been balanced on the footing that no more than £50 is this year again to be carried to the "Contingency and Depreciation of Works Fund," under the 83rd section of the Act of Parliament. This is, of course, a question for the discretionary consideration of the commission; but the auditor would not consider himself to be fulfilling his duty were he not respectfully to submit that, looking to the extent of the gas establishment, and the high valuation at which the same stands in the books, in a year when there is about £2000 of a surplus to dispose of, so small a sum as £50 is, in his opinion, a most inadequate allowance to allocate therefrom towards depreciation and other contingencies. Should this entry remain as proposed, there will only stand at the credit of the depreciation account, after three or four years working, a sum, in all, of £100 towards a fund which the Act of Parliament contemplates on reaching to £6000.

An estimate of the revenue and expenditure for the year from April 30, 1875, to April 30, 1876, was also laid on the table. The total estimated expenditure was £13,615 12s. 11d., made up as follows:—4242 tons of coal at the average price of 21s., £4454 2s.; lime account, £200; wages account, £2150; miscellaneous repairs and charges, £550; meters and furnishings, £50; main and service pipes, £300; feu duties and taxes, £600; incidental payments, £70; stationery and printing, £35; annuities, £2812 10s.; interest account, £440; sum required by the Act to be set apart annually as a sinking-fund, towards the payment of borrowed money, £500; contingency and depreciation of works fund, £200; sum towards reduction of preliminary and parliamentary expenses, £483 4s. 1d.; surplus to be disposed of as may be resolved on, £770 16s. 10d. The estimated revenue showed that the total gas and meter rental is as follows:—

36,866,000 cubic feet, at 5s. 5d. per 1000	£9,984	10	10
900,000 cubic feet, at 6s. 3d. per 1000	281	5	0
Rent of meters	480	0	0
	£10,745	15	10

Instead of allowing the large consumers 10d. per 1000 cubic feet as formerly, it was proposed to allow only 12½ per cent.; and as this per centage on 13,000,000 cubic feet amounted to £440 2s. 1d., the net estimated gas and meter rental is £10,305 13s. 9d. The other items of revenue were made up of the balance from 1874-75, £1975 19s. 2d.; naphtha work, £900; tar receipts, £90; coke account, £300; and rent of property, £44.

The report stated that the commissioners would now be able to sell gas to the inhabitants of the town at 5s. 5d. per 1000 feet, instead of 7s. 1d. last year, being a reduction of 1s. 8d. per 1000 feet.

Mr. M'Kenzie, chairman of the Finance Committee, moved the approval of the balance-sheet and estimate. As they had heard from the auditor's report, the affairs of the Gas Commission during the past year had been most satisfactory. The estimate adopted last year and the actual expenditure were also very satisfactory indeed to the commissioners. Through the help of Mr. Deas and other members, a saving of somewhere about £700 had been effected in the purchase of coals. On various other items large savings had been effected, and the excellent results now obtained showed the satisfactory working of the new works. In regard to the "Contingency and Depreciation of Words Fund," he had no objection that £200 should be laid aside; but he hoped that it would be a contingency-fund in reality, and not merely a sinking-fund; while the expenses of repairs, &c., would be defrayed out of revenue. While they were now proposing to reduce the price of gas 1s. 8d. per 1000 cubic feet, and had last year reduced it 5d. per 1000 cubic feet, he hoped that next year a further reduction would take place, although it could not be expected that it would be as large as that now proposed.

Mr. Carnegie seconded Mr. M'Kenzie's motion, but protested against the heavy reduction proposed to be given to the large consumers. He had had this matter before the commission at different times, and last year his motion was only lost by a majority of three. However, his efforts had succeeded so far that, instead of their getting a reduction of 10d. per 1000 cubic feet, they were to get 12½ per cent. There was not a single corporation throughout the whole of Scotland that gave such a heavy reduction to the larger consumers.

The motion was unanimously agreed to, the price of gas being fixed at 5s. 5d. per 1000 cubic feet, instead of 7s. 1d. as formerly. The price of gas at Scone was fixed at 6s. 3d., instead of 7s. 11d.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

It has once more to be recorded that trade in all its ramifications is very quiet, and apparently likely to remain so.

A good deal of stringency is being observed in all "paper" transactions, both by the banks and everybody else concerned, there being a general impression that bills have hitherto been given where there was no necessity, and where cash would at the time have been quite as convenient. Recent failures have, of course, fostered this impression; hence it is not unlikely that a safe cash basis will for a time rule in all ordinary transactions. Pig iron is locally a trifle steadier on the week, in consequence of the renewed firmness of the Scotch market. Cleveland agents for G.M.B. give the following quotations:—No. 1 foundry, 58s. 6d.; No. 2 foundry, 55s. 6d.; No. 3 foundry, 53s.; No. 4 foundry, 52s.; No. 4 forge, grey, 51s. 6d.; No. 5 forge, mottled, 51s.; No. 6 forge, white, 49s.; refined metal, 71s. 6d.; Kentledge, 62s. 6d.; and cinder pigs, 43s., all for net cash. Derbyshire and Yorkshire pig is nominally unchanged at the recently noticed prices.

The foundries are hardly so busy, with one or two good exceptions. Amongst other commissions, the Staveley Works are engaged in producing a quantity of 4-inch pipes for the temporary water supply of the Dronfield and Unstone district. These pipes will be supplied at present from the reservoirs of the Chesterfield Water-Works, and will afterwards be taken up, replaced by larger mains, and utilized as services. William Corbitt and Co., Limited, Masborough Foundry and Dovegrate Works, have declared a dividend of 10 per cent. for the past year.

The brassfoundries are still very busily engaged on all descriptions of plumbers brasswork, and some of them, notably Messrs. Guest and Chrimes, of Rotherham, are producing patent hydrants, meters, &c., on a large scale.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The iron trade of this district continues very dull, though prospects are somewhat improved by the anticipated revision of the wages scale, which will be settled in a few days; and, by the reduction in the price of coal, just announced by the Cannock Chase firms, the forge qualities of fuel have been lowered 3s. per ton, and best household descriptions 1s. per ton, and it is now thought probable that the colliery owners on the Dudley side of the district will follow suit, a course which would give the much-needed relief to the makers of unbranded iron, who are still struggling with an unremunerative trade, the thick coal of the Dudley district, being used almost exclusively in iron manufacture, it practically rules the market.

It is now generally conceded that the coalmasters are convinced of the necessity of lower quotations for the better class of fuel, and their decision in the matter is awaited with much interest. In case of a substantial reduction, the present standard of prices for branded iron would be at once lowered; but it is improbable that any important reduction will be made in the quotations for the commoner qualities of iron, which we are assured have already passed the minimum of profitable manufacture. Prices for manufactured iron of all descriptions are naturally unsettled, and there is very little business doing; but the pig iron market is tolerably steady, and without noteworthy change.

The colliers in the Cannock Chase district have received notice of a reduction in wages to the extent of 3d. per day, and it is generally expected that they will offer no resistance to this proposal.

Continued activity prevails at the ironfoundries around West Bromwich, though the orders received during the past week have been unimportant. The season demand for gas and water pipes has been considerably in excess of any former period.

The wrought tube and fitting trades of Wednesbury continue very languid, and with little prospect of any early improvement, the competition of rival producers on the Continent and in the United States being unusually severe.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

The coal market in the Manchester district is not really in a worse position than it has been for the last five or six weeks; but the rumours of reduction in the Oldham district have tended to keep back orders, as a substantial lowering of the rates on the part of the Oldham colliery proprietors would keep a deal of the Manchester coal out of the above district, and throw it upon the stocks in the Manchester market. It is reported that a reduction of 1s. 8d. per ton has been made in some quarters, and this may lead to some small concessions next month in fuel for manufacturing purposes by the coalowners in the Manchester district; but, as stocks are still comparatively low, it is scarcely probable that house coal will be touched. The house coal trade in the Manchester district is naturally quiet, but not duller than usual at this time of the year. Of coal for engine and forge purposes there is more in the market than is required; but really good classes are not difficult to sell; and for stock, now that the weather is more settled, there is a better inquiry for brickmaking, whilst the make of this description of fuel being now small, naturally tends to keep prices steady.

The round coal trade in the West Lancashire district is exceedingly quiet, and very low prices are being quoted for all descriptions of fuel, large purchasers being able to place their orders on very advantageous terms.

For gas coal there has not been quite so much inquiry in the Manchester district during the past week, those consumers who were compelled to come into the market having now pretty generally covered their requirements for the present, whilst those who have stocks on hand still seem inclined to hold back for lower rates; but prices remain steady, at the quotations last given. Most of the cannel which is raised in the above district has now been placed. In the Wigan district there is a fair demand for gas coal, at prices ranging from 11s. to 12s. per ton at the pit; and Wigan cannel runs from 27s. to 30s. per ton, according to quality.

The iron trade shows little or no sign of improvement, and there is a great deal of underselling to secure orders. Lincolnshire makes of forge iron are quoted as low as 60s. per ton, delivered in the Manchester district; and Cleveland iron delivered is quoted at 61s. to 62s. for foundry, and 59s. to 60s. per ton for forge. Lancashire pig iron, so far as the Wigan makers are concerned, is without change, but in other quarters prices are irregular. In finished iron there is little or no change to notice, bars being quoted at £8 10s. per ton delivered.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the North of England continues in a dull, inanimate condition. Households are now down to 14s. per ton. There were smaller quantities of best gas coals shipped at the Tyne Dock last week than in any week during the past two months. Second-class gas is very dull, and prices of these sorts are pretty much a matter of bargain. Manufacturing coals have scarcely maintained recent advances, and steam coals are weaker. This week there will be little work done at the Tyneside and Wear pits on account of Newcastle races. In fact, most of the pits will be laid off work from Monday until Friday morning.

The coasting shipping trade is extremely dull. Such a thing as screw colliers being laid by at Midsummer-day has never been heard of before. But last week fully a dozen coasting collier steamers were laid up in the Tyne without employment. There is no great demand either for small ships to load coals for the East Coast, the British Channel, France, Holland, or Hamburg, and coasting rates, which include all these, are low. There has been a better inquiry for steamers to load for the Baltic; and there was another advance of about 5s. per keel for Cronstadt and the adjacent ports last week. Mediterranean business is moderate, and there is very little doing for the East Indies from the Tyne.

As might have been expected from the condition of financial matters in London, the Cleveland iron trade is in a very depressed condition. The iron factories of the Tyne are working somewhat irregularly—that is, some large concerns on that river are very fully employed, whilst others have little or nothing to do. The engine factories, as a rule, are doing a very poor business, and iron shipbuilding is slack. There is a very good demand for most classes of fire-clay goods, and the chemical trade, with the exception of bleaching powder, which is down to £8 per ton, with 4 per cent. discount, is tolerably steady.

The Local Government Board have refused to send down an inspector to inquire into, and report upon, the water supply of the borough of Tynemouth. The corporation of that place have requested the mayor to convene a meeting of the burgesses, to see if it would be advisable to purchase the North Shields Water-Works.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

As a faithful chronicler of events falling within my province, I am in duty bound to mention several other instances of reductions in the price of gas, although, I must confess, it has now very much become a kind of harping upon one string. First, then, with reference to the gas company of Bankfoot, a town in Perthshire, at the annual meeting of which, lately held, it was resolved to lower the price of gas 10d. per 1000 feet—the price being now 10s. 10d. A dividend of 2½ per cent. was declared to the shareholders, and it was stated in the report that the company was in a more prosperous condition than at any former time. The gas manager was considered in a pecuniary sense in making the arrangements for the ensuing year. The Kinross and Milnathort Gaslight Company's annual meeting was recently held, and, from the report of the directors, the company's affairs were found to be in a very flourishing condition. A reduction of 10d. per 1000 feet—the amount added last year—was made, the reduced rate being 7s. 6d. per 1000 feet. The dividend declared was 5 per cent., and an increase of £15 per annum was added to the manager's salary. A reduction from 10s. per 1000 feet—the price at which gas has stood for two years—to 8s. 4d. has been made by the Fraserburgh Gaslight Company. The annual meeting of the Muirkirk Gas Company was held last Monday, when a dividend of 10 per cent. was ordered to be paid on the 10th proximo, out of the profits of the past year, which terminated on the 31st ultimo, and the price of gas was reduced from 6s. 8d. to 5s. 5d. per 1000 feet. Considering the proximity of Muirkirk to the most famous gas coal deposit in Scotland, even the reduced rate ought to yield a very handsome profit.

While speaking of Perth last week, I failed to mention that the price of gas at Scone, the place of coronation of the ancient Scottish kings, was reduced by the Perth Gas Commissioners from 7s. 11d. to 6s. 3d. per 1000 feet. There was a reduction of 5d. at Perth last year, and it is expected that a further reduction will be made next year.

The gas company of Auchinleck (famous as the birthplace of Johnson's Boswell) have declared a dividend of 5 per cent., and carried forward the sum of £21 13s. 2d.

It seems that the formation of the threatened new gas company at Johnstone is held in abeyance in the meantime, so as to see what result attends the movement in Parliament on the gas question by Sir Windham Anstruther.

At a meeting of the Town Council of Edinburgh held a few days ago, the gas question was again up for consideration. The clerk submitted a letter from the Edinburgh Gas Company, intimating a reduction in the price of gas supplied to the public lamps. It was to the effect that the directors had resolved to reduce the charges from the 15th of May from 23s. 1d. to 18s. 10d for the regulated burners, from 34s. 6d. to 29s. 5d. for the patent jets, and from 88s. 4d. to 75s. 3d. for the bat's-wings per 3926 hours; the charge for lamps per meter to be reduced from 4s. to 3s. 8d. per 1000 cubic feet. Mr. Rowatt thought the council ought to appoint a committee to meet with the directors of the gas company as to certain items of their charges that were not consistent. The council were the largest consumers of gas, and paid the companies £6000 a year, and the company ought to give them better conditions. The treasurer said the fact of the reduction now about to take place, being to the extent of about £1000 a year, showed the profits of the gas company must have been something very considerable. The Lord Provost said there was at present a motion on the table proposing to buy up the works of the gas company. It was agreed to engross the letter in the minutes, and to recommit the matter to the committee, with the addition of Treasurer Colston, to confer with the gas company as to a further reduction or adjustment. At the same meeting, Councillors Mossman and Turnbull gave notice of the following motion for next meeting:—"That it be remitted to the Lord Provost's committee to introduce into the municipal bill to be promoted in next session of Parliament, clauses to regulate the quality and price of the gas supplied by the two Edinburgh Gas Companies; also clauses to enable the Town Council to acquire the works of the said companies by mutual agreement."

Again there is abundance of news in connexion with the question of water supply. In his report upon the Rothesay Water-Works (briefly referred to last week), Mr. Gale describes Loch Ascog, the source of supply, as extending to 92 acres, with a surrounding watershed of 400 acres. He gives the rainfall as 48 inches, but it was as low as 34 inches in 1855. The loch is capable of supplying 465,000 gallons per day, or 35 gallons per head per day to a population of 17,000. It is about 100 feet above sea level, and, after making due allowance for friction, the water would rise 73 feet during the day and 88 feet at night; and the pipes are more than adequate to supply a population more than double that of Rothesay. The whole works are in excellent order, and Mr. Gale concludes his report by declaring that he has not heard or known of such a large supply having ever been offered for sale at so very moderate a price (£22,500).

Until the Edinburgh and District Water Trustees get their new works completed, they are compelled to keep a constant surveillance on their actual powers of supply; and for that purpose they issue a statement every fortnight, which is always scanned with great anxiety, especially during periods of dry weather. The report just issued shows that, on the 22nd inst., the total quantity of water in store was 64,510,000 cubic feet, as against 73,195,000 cubic feet on the 8th inst., and 74,640,000 cubic feet in 1874. In every reservoir there has been a fall of several feet, except in Clubbiedean and Bonally. The delivery in Edinburgh is stated at 852·86 cubic feet per minute, as compared with 852·86 on the 8th inst., and 844·96 in the corresponding date of last year, this delivery being equal to 27·84 gallons per head per day to a population of 275,700. The rainfall at Glencorse, from the 1st of January to the 22nd of June, has been 12·60 inches, 11·30 inches having fallen within the same period in 1873, and 11·90 inches in 1874.

The Kirkcaldy and Dysart Water-Works Commissioners paid their annual visit to the works on Wednesday. On reaching the ground they made a thorough inspection of the works, and found them to be in good condition. Two copious springs had been introduced into the domestic water supply since their last visit, and these had added greatly to the improvement of the works. It was shown that 800,000 gallons of water were passing through the pipes per day, leaving, after deducting the supply for the public works and the village of Wemyss, 635,000 gallons to the population of Kirkcaldy and Dysart, or 27 gallons per head per day of the population.

A special meeting of the Glasgow Corporation Water Committee was held on Thursday, for the purpose of considering Bailie Scott's long-standing motion, regarding the application of Deacon's waste-water meter in a portion of the city. After he had made a long speech in support of his motion, and after some discussion upon it, Bailie Scott consented to a modified motion from the Lord Provost, which was—"That measures ought to be adopted to save the waste of water that is taking place over our whole area of supply, and that it be remitted to the sub-committee on works to consider and report on the best mode of preventing such waste in future."

There has been some firmness in the iron market since last report, but on one or two days there was no business done. Several makers have advanced their prices 1s. per ton, and in one instance the advance was 2s. Friday's quotations were 59s. 6d. and 59s. 7½d. in the morning, but in the afternoon there was a slight decline. Several of the pipefounders are very busy on large pipes, chiefly for water supply.

If anything, the coal trade is even duller in the Glasgow district, but prices are not falling to any extent. Mine owners are very unwilling to make any further reduction in the rate of wages, lest the supply of mining labour become still further diminished than it is, owing to emigration and many men leaving the trade for others that are better remunerated.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

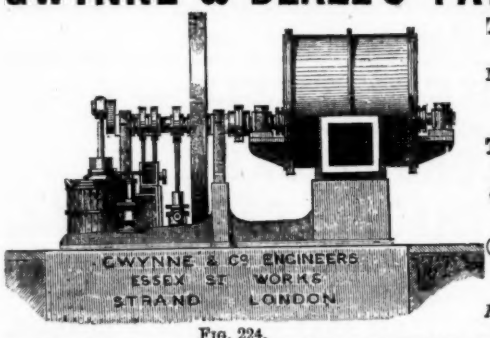


FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

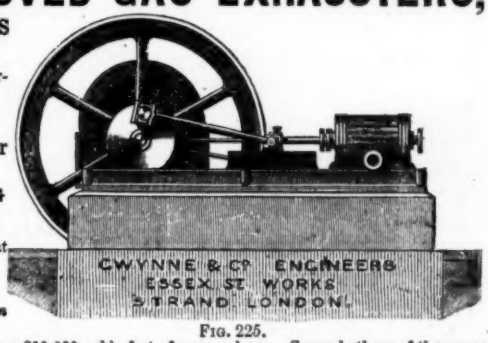


FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,

CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.

Now Ready, price 10s. 6d.,

AN ANALYSIS OF THE METROPOLITAN GAS COMPANIES ACCOUNTS FOR 1874,

(In continuation of the five previous Years, 1869—1873,)

COMPILED AND ARRANGED BY JOHN FIELD,

CHIEF ACCOUNTANT TO THE IMPERIAL GAS COMPANY.

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WM. B. KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C., AND OF

EDEN FISHER, STATIONER, 50, LOMBARD STREET, LONDON, E.C.

Now ready, price 7s., by Post 7s. 3d.,

A SECOND EDITION (fcap. 8vo., morocco gilt) OF

THE GAS MANAGER'S HANDBOOK,

CONSISTING OF

Tables, Rules, and Useful Information for Gas Engineers, Managers,

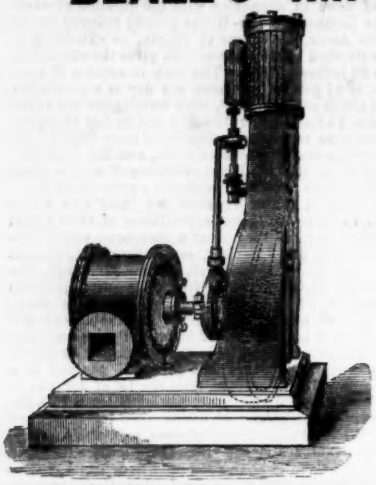
And others engaged in the Manufacture and Distribution of

COAL GAS.

BY THOMAS NEWBIGGING, A.I.C.E.

WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

BEALE'S IMPROVED PATENT GAS-EXHAUSTER



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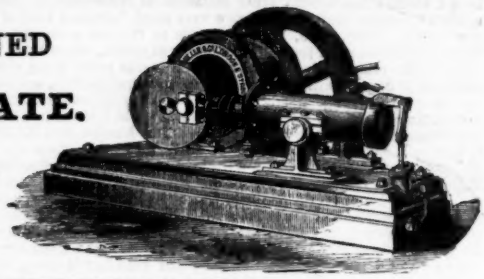
GEORGE WALLER & CO.,

Who, since Mr. BEALE'S retirement, are the Oldest Makers.



EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
MAKERS of ENGINES, BOILERS, and GAS MACHINERY.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever.
MANN'S and many other descriptions of WATER DISTRIBUTORS.
SCRUBBERS, PURIFIERS, and CONDENSERS.
EXHAUSTERS from 3000 to 60,000, new and second hand, in stock.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, S.E., & at STROUD, GLOUCESTERSHIRE.

D. BRUCE PEEBLES & CO.,

ENGINEERS,

FOUNTAINBRIDGE WORKS, EDINBURGH,

MANUFACTURERS OF WET AND DRY GAS-METERS;

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ABOVE 30,000 OF WHICH ARE NOW IN USE.

"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S., F.C.S.*

D. BRUCE PEEBLES AND CO., FOUNTAINBRIDGE WORKS, EDINBURGH.

NORTH BRITISH ASSOCIATION of GAS MANAGERS.

The FOURTEENTH ANNUAL GENERAL MEETING of the Members of this Association will be held in the

GUILDHALL CORPORATION BUILDINGS,

HIGH STREET, DUNDEE,

On FRIDAY, the 9th of July, at Ten o'clock A.M.

G. R. HISLOP, Esq., PRESIDENT,

Will occupy the Chair.

PROCEEDINGS.

BUSINESS MEETING.

Reading of Minutes.

Admission of New Members, &c.

The following Proposal to alter Rule VII. of the Regulations will be submitted for approval:—"That the Committee shall in future consist of President, Two Vice-Presidents, and Six Members, the three Members first on the List each year to retire at the close of the year."

PRESIDENT'S INAUGURAL ADDRESS.

Auditor's Report.

Election of Office-bearers.

LIST OF PAPERS AND COMMUNICATIONS.

"A New Dip-Pipe and Bye-Pass for Hydraulic Main." By Mr. JOSEPH GIBB, Gas-Works, Armagh.

"Appliances for Removing or Lessening the Dip-Pipe Seal in Hydraulic Mains." By Mr. GEORGE BOYD, Gas-Works, Alloa.

"An Alarm Pressure-Gauge." By Mr. P. A. BLACK, Joint-Stock Gas-Works, Falkirk.

"Malam's Process of Gas-Making." By Mr. ALEXANDER SMITH, Gas-Works, Aberdeen.

"The Relations which exist between the Durability and Bromine Tests, and the Illuminating Power of Gas, as expressed in Standard Candles." By Mr. A. MACPHERSON, Gas-Works, Kirkcaldy.

"A Word to Gas Managers, with special reference to the necessity for Improvement in the Use of Gas." By Mr. B. M. M'CRAE, Gas-Works, Dundee.

"The Construction of Concrete Tanks." By Mr. A. MACPHERSON, Gas-Works, Kirkcaldy.

LECTURE.

At Three o'clock a Lecture will be delivered by STEVENSON MACADAM, Ph.D., Lecturer on Chemistry, &c., Edinburgh, on "Chemistry, in its Relation to the Manufacture of Gas."

DINNER.

At Half-past Four o'clock the Members and Friends will Dine together in the Royal Hotel, Dundee. Tickets for the Dinner, 5s. each, may be had from the Secretary, early application for which is specially requested.

WM. M'KENZIE, Hon. Sec.

Gas-Works, Dunfermline, June 25, 1875.

THE BRITISH ASSOCIATION OF GAS MANAGERS AND THEIR FRIENDS.

A First-Class PHOTOGRAPHIC GROUP of the above, 12 in. by 10 in.,

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LIME SUPERSEDED

IN THE

PURIFICATION OF ILLUMINATING GAS

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SPENCE'S PATENT DRY COPPERAS.

The only purifying material which removes by one process, without injury to the purifiers, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of five years at some of the largest Gas-Works in the Kingdom.

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PURCHASERS OF SPENT OXIDE AND AMMONIACAL LIQUOR, AND CONTRACTORS FOR THE PURIFICATION OF COAL GAS.

WANTED, for a Tar Distillery in the country, a WORKING FOREMAN.
Apply to R. R. KELLY AND Co., 59, Mark Lane, LONDON.

WANTED, in town and country, Work-ING FOREMEN for Sulphate of Ammonia Works. They must be steady, intelligent, and honest.
Apply to R. R. KELLY AND Co., 59, Mark Lane, LONDON.

WANTED, a Stoker. Constant employ-ment; 28s. per week. Accustomed to manage an exhauster.
Apply, with copies of testimonials, to No. 169, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, for works in London and North and South Wales, a few old BOILERS, in good condition; also three or four second-hand high-pressure Steam Boilers.
Apply, with all particulars, to R. R. KELLY AND Co., 59, Mark Lane, LONDON, E.C.

TO SULPHATE MAKERS.

WANTED, a Working Foreman, capable of taking charge of a small Sulphate Works and Tar Distillery. Good wages, with house and garden, to a competent man.
Apply, with terms and references, to No. 168, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Working Foreman for a small Gas-Work, to lay mains and services, do general repairs, and make himself useful, as required. A smith preferred.
Apply, stating wages, with testimonials or references, to No. 171, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

A Young Man, aged 23, the son of a country Manager, desires a situation as ASSISTANT in a Laboratory of a Gas-Work. Is a good analyst, having studied under Frankland and Valentin. A moderate salary only required. No objection to go abroad.
Address No. 170, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Advertiser, aged 28, having over eleven years experience in both in and out door work, main and service laying, testing same, &c., desires a RE-ENGAGEMENT. Also uses the photometer. Good testimonials. Lately returned from abroad, and no objection to proceed abroad again.
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NEW EDITION, NOW READY,
ADVANTAGES OF GAS FOR
COOKING AND HEATING.
By MAGNUS OHREN, A.I.C.E., F.C.S.
For Companies to issue to their Gas Consumers.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

FOR SALE—Six Hydraulic Mains, 1 ft. 6 in. by 1 ft. 4 in. diameter.
Two 20-ft. lengths, with 16 holes for dip-pipes, 14 in. apart, 5½ in. diameter.
Two 16 ft. 3 in. lengths, with 14 holes for dip-pipes.
Two 15 ft. 6 in. lengths, with 12 holes for dip-pipes.
All in good condition.
Apply to Mr. ROBERT LINGING, Manager, Gas-Works, Etruria, STAFFORDSHIRE.

TO TAR DISTILLERS.

THE Directors of the Independent Gas-light and Coke Company are prepared to receive TENDERS for the TAR produced at their works, at Haggerston, for One year, from the 31st of July, 1875.
Tenders to be sent to me, on or before Thursday, the 8th of July, endorsed "Tender for Tar."
The Directors do not bind themselves to accept the highest or any tender.—By order,
JAMES B. COULSON, Secretary.
236, Kingsland Road, June 22, 1875.

FOR SALE—A capital 4-horse Table ENGINE, in excellent condition; governor and feed-pump, turned fly-wheel, egg-end boiler with double valves, indicator, and furnace work complete.
Address P. M. HAGUE, Newbury, BERKS.

FOR SALE—A 4-horse Engine and Ex-HAUSTER, to pass 10,000 cubic feet per hour. Self-acting bye-pass and two gas-valves, 8-in. connexions and exhauster governor.
For further particulars, or to view the same now working, apply at the GAS-WORKS, WALTON-ON-THAMES.

FOR SALE.

THE Stoke Gas Company have for Sale a Telescope GASHOLDER of the following dimensions—viz., bottom lift, 42 ft. by 16 ft.; top lift, 40 ft. by 16 ft., with chains and balance-weights. It can be seen at the above company's works.
The holder to be taken down and removed at the expense of the purchaser.
Any further information with respect to same may be obtained on application to Mr. John M'MILLAN, the Company's Secretary and Engineer.
Wharf Street, Stoke-on-Trent.

THE St. Day Fire-Brick and China Clay Company, Limited, having largely increased their works, are now prepared to TENDER in any quantity for the supply of their well-known BRICKS and other FIRE GOODS, either for the Home trade or exportation. Prices and samples will be forwarded on application to the works, St. Day, CORNWALL, or the London Offices, 7, St. Bene't Place, GRACECHURCH STREET.

THE Scarborough Gas Company have FOR SALE, in consequence of removing to their New Works, a first-class Telescope GASHOLDER, 52 ft. in diameter and 44 ft. deep. It was made and erected by C. and W. Walker, of Donnington, in 1868, and is in excellent condition. It is of remarkably good workmanship, being perfectly circular and true, and free from all irregularities. The columns and girders are of handsome design and highest class of work.
Gas Companies wanting a good Gasholder this year will find this an advantageous opportunity.
For further particulars apply to
JAMES MOON, Gas Engineer, Scarborough.

TO IRONFOUNDERS.

THE Gas Committee of the Rochdale Corporation invite TENDERS for the supply of cast-iron GAS-PIPES, of 4, 5, 6, 18, and 20 in. diameter, in accordance with specification, which may be seen on application to the Engineer, Mr. Hunter, at the Gas-Works, Rochdale.
Tenders, endorsed "Gas-Pipes," must be delivered to me on or before the 6th of July, 1875.
The Gas Committee do not bind themselves to accept the lowest or any tender.—By order,
ZACH. MELLOR, Town-Clerk.
Town-Hall, Rochdale, June 16, 1875.

GAS COAL WANTED.

THE Ludlow Union Gas Company are prepared to receive TENDERS for the supply of 400 tons of best GAS COAL, to be delivered, according to the Company's requirements, during the 12 months from the 1st of July next.
Tenders, stating price per ton delivered at Ludlow Station, to be forwarded to the SECRETARY, Ludlow Union Gas Company, Castle Street, LUDLOW.

SKOINES'S PATENT FOR IMPROVE-MENTS IN THE MANUFACTURE OF GAS. The Liquidator of the Coal Economizing Gas Company is prepared to receive OFFERS for the PURCHASE of the above-named PATENT.
A copy of the specifications, together with the reports of the Engineers, who have experimented and reported upon the Patent, can be seen upon application at the Liquidators Office.
Tenders should be addressed to the Liquidator, C. R. TENNANT, Esq. (Messrs. Kemp, Ford, and Co.), 8, WALBROOK, E.C., or to Messrs. WILKINS AND BLYTH, Solicitors, 10, ST. SWITHIN'S LANE, E.C.

TENDERS FOR GAS COAL.

THE Walsall Improvement Commis-sioners invite TENDERS for the supply of 12,000 tons of Staveley, Yorkshire, or any other good GAS COAL, which may be delivered either at Walsall Railway Station, or by boat at Walsall Gas-Works; in the latter case it will also have to be unloaded and stacked in the coal-shed or such other place at the Gas-Works as may be directed. The Coal will have to be delivered at the rate of from 150 to 400 tons per week, as the Commissioners may from time to time require. The weight, if delivered by rail, must be 2352 lbs. to the ton, if by boat it must be 22 cwt. to the ton, boat gauge. Payments monthly.
The Commissioners do not bind themselves to accept any tender, and they reserve the right to divide the contract between several firms.
Tenders, sealed and marked outside "Tender for Gas Coal," and stating the price for large Coal and also for Nuts, are to be sent to the undersigned on or before Saturday, the 17th of July.
SAMUEL WILKINSON, Commissioners Clerk.
Bridge Street, Walsall, June 22, 1875.

Mr. NORWOOD EARLE,
GAS SURVEYOR,
12, QUEEN VICTORIA STREET, E.C.,
Advises on all matters connected with the Distribution of Gas, Public Lighting, Gas Testing, &c.
Valuations made for Assessment and other Purposes.

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Gas-Works surveyed, mapped, and reported on, and extensions or alterations designed and the particulars specified, and work estimated for and executed.

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Supplies every requisite in connexion with the distribution of Gas and Water.
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Cast-Iron PIPES and VALVES.
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Patent Pipe SCREWING-MACHINES, &c.

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Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.
To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.
To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

WM. RICHARDS,
INVENTOR OF THE DRY GAS-METER,
REVISER OF "HUGHES ON GAS-WORKS,"
CONSULTING GAS ENGINEER,
Advises on all matters of business connected with Gas Lighting. Furnishes Working Drawings of Retort-Settings, Specification of Works, complete or in detail.
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TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
Patents procured for Foreign Countries.
Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

WATER-MAINS.

COTTERILL'S PATENT STEEL TUBE-DRILLS, for connecting services to water-mains, *under pressure*, without turning off the water. They drill and tap themselves, and are left in the mains. Made of all sizes, from ¾ to 2 inches and upwards. They cost less than the ordinary plan.
Apply to CHARLES FORSTER COTTERILL, Cannock, STAFFORD, Patentee.

OXIDE OF IRON.—
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,
Keep in London and at their works large stocks of PIPES and CONNEXIONS (1½ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
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GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

B. GIBBONS, JUN.,
DIBDALE FIRE-CLAY, BRICK, AND GAS-RETORT WORKS,
STOURBRIDGE (Established 1834),
MANUFACTURER OF EVERY DESCRIPTION OF
Burs, Lumps, Stays, Shields & other Bricks, & Gas-Retorts,
A LARGE QUANTITY OF RETORTS ALWAYS IN STOCK.

Circular .	14 in.,	15 in.,	16 in.,	18 in.
Ovals . .	17 in. × 14 in.,	17 in. × 15 in.,	20 in. × 15 in.,	21 in. × 15 in., &c.
D's. . .	14 in. × 14 in.,	15 in. × 12 in.,	15 in. × 13 in.,	17 in. × 14 in., 18 in. × 13 in.
	18 in. × 15 in.,	20 in. × 16 in.,	22 in. × 14 in.,	24 in. × 14 in., 24 in. × 15 in., &c.

Special attention given to the execution of Export Orders.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.
South Shields. W. J. WARNER.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine: (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.
J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

THOMAS ALLAN & SONS, of Springbank Iron-Works, Glasgow, manufacture small cast-iron GAS AND WATER PIPES, 1¼ to 6 inches, at their branch works, Stockton-on-Tees, and have at present a large stock, which they are open to sell at moderate prices.

WOLSTON'S TORBAY IRON PAINTS.

THE Torbay and Dart Paint Company, Limited, 23, Great George Street, Westminster, S.W., having been informed that PAINTS not manufactured by them are being offered to Gas Companies and the public as "WOLSTON'S," hereby give notice that they will TAKE PROCEEDINGS against any persons infringing their rights as sole proprietors and manufacturers of Wolston's Torbay Iron Paints.
(See Advertisement on another page.)

GARSIDE'S IMPROVED REGISTERED TUBE-VICE, holds all sizes of Wrought-Iron and Brass Tubes, from a 2-in. socket to the smallest brass tube made.

GARSIDE'S IMPROVED MAIN DRILLING CLIP, made in two sizes, to drill from 2-in. to 6-in. Mains, and from 6-in. to 12-in. Mains.
The above tools are made light and handy.
For drawings, &c., apply to the maker, SAMUEL GARSIDE, Gatefield Iron-Works, ASHTON-UNDER-LYNE.

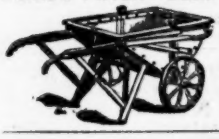
BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.
By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.
Licences to work the invention will be granted to Gas Companies on very reasonable terms.
For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.
The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

IN THE MATTER OF BRONNER'S PATENT BURNERS.

NOTICE is Hereby Given that Julius Brönner, on the 20th of April, 1875, in a suit in Chancery, 1874, B 365, obtained an injunction perpetually restraining the Defendant, his Agents, Servants, and Workmen, from in any way advertising or offering for sale, or selling, or from in any manner causing to be advertised, or offered for sale, or sold as "Real Brönner," or "Brönner," or "Broehner" Burners, any Burner not manufactured by or for the Plaintiff, Julius Brönner, or by his Agents.
JACKSON, FOX, AND ELLEN,
55, Chancery Lane, London,
Solicitors for the Plaintiff,
JULIUS BRÖNNER, Frankfort-on-Maine.

PRICE'S PATENT COKE & COAL BARROW.



effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

C. & W. WALKER,
MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE,
MANUFACTURERS OF
TELESCOPIC AND SINGLE-LIFT
GASHOLDERS,
CAST & WROUGHT IRON GASHOLDER-TANKS,
CONDENSERS, SCRUBBERS, & PURIFIERS.
LONDON: 8, FINSBURY CIRCUS, E.C.

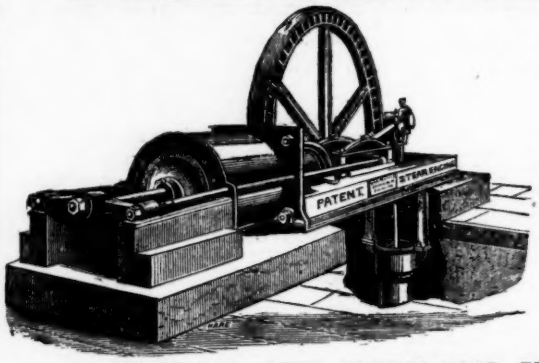
TRADE MARK. J. BEALE'S PATENT GAS EXHAUSTER.

BEALE'S CONTINUOUSLY ACTING
GAS EXHAUSTERS
ARE NOW MANUFACTURED BY
B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.
B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.
Estimates and Prices on application to
B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
BERMONDSEY, LONDON, S.E.

ECONOMY OF FUEL IN STEAM-ENGINES.

B. DONKIN & CO.,
PATENT HORIZONTAL COMPOUND CONDENSING
STEAM-ENGINES,
APPLICABLE FOR DRIVING GAS-EXHAUSTERS.

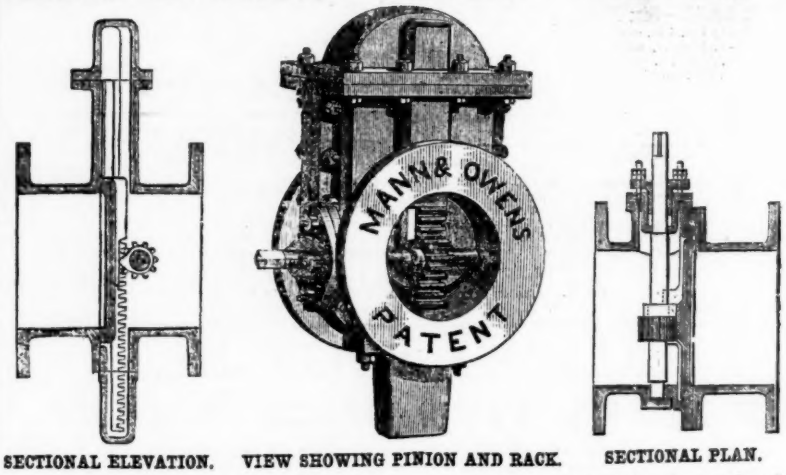


These Engines have been at work a sufficient number of years to prove their durability and efficiency.

One of them has been subjected to a scientific and exhaustive trial to test the consumption of fuel, with the result that an expenditure of less than **2 lbs.** of coal per hour developed one indicated horse power.

Full Details of this Trial, and Prices, sent on application to
B. DONKIN & CO., BLUE ANCHOR ROAD, BERMONDSEY, S.E.

MANN & OWENS' PATENT GAS-VALVE.



SECTIONAL ELEVATION. VIEW SHOWING PINION AND RACK. SECTIONAL PLAN.

The advantages of this Patent Valve over all others yet introduced are, that it is always as tight as the best wedge or spring valve, without the possibility of setting fast or becoming suddenly leaky. The surfaces not being in contact during the operation of opening or closing, leakage through wear and tear is avoided.
The Gas Engineer will not fail to see the importance of such a valve in connexion with his purifying apparatus, particularly in the case of large sizes.
The slide being operated either by a screw and nut, or by a pinion and rack, a cam bearing upon a plane, cast on the back of the Valve, forces it against the face, and renders the escape of gas an impossibility. By a slight turn of the pinion or screw, the slide is released, and brought away from the face, by which means friction is avoided, and the only force required to open the Valve is that due to its own weight.

SOLE MANUFACTURERS:
S. OWENS AND CO.,
HYDRAULIC AND GENERAL ENGINEERS,
WHITEFRIARS STREET, LONDON, E.C.
PRICES, SIZES, AND FULL PARTICULARS ON APPLICATION.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

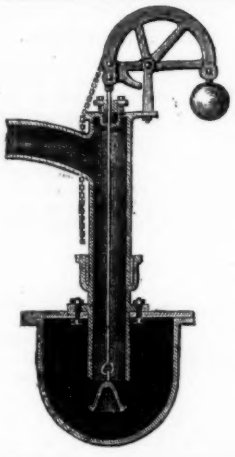
2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.



BOX'S
PATENT ANTI-DIP VALVE

Affords a clear gas way through the dip-pipe while the retort is in action, and produces a perfect seal at pleasure, or whenever the retort is open, offering great security against the drawing of air, and obviating the necessity for using any liquid in the now so-called hydraulic main. It is easy of application to existing apparatus, and is comparatively inexpensive. Is not likely to get out of order, as the tar, which will adhere to the botton of the dip-pipe and the flange of the cone, both of which are faced, will act as a lubricant, and prevent undue wear and tear. The whole, as will be seen on inspecting the accompanying illustration, is exceedingly simple, and every part accessible. To adapt it to the present dips, all that is necessary is to face the bottom edge of the dip-pipe, and suspend a cone by a rod, which passes through the bonnet, the raising and lowering of the cone being performed through the intervention of a weighted eccentric.

The Patentee is prepared to supply Patented Apparatus upon the most moderate terms, and will be happy to reply to any inquiries that may by adddressed as under—

W. BOX,

GAS-WORKS, CRAYFORD, KENT

KÖRTING BROTHERS,

SOLE LICENSEES FOR

W. CLELAND'S PATENT STEAM-JET GAS-EXHAUSTER.

E. KÖRTING'S PATENT STEAM-JET GAS-EXHAUSTER.

Small Cost—Compactness—Perfectly Self-Acting—Self-Regulating—Self-Cleansing—Smallest Boiler Pressure Sufficient—No Steam-Engine—No Gearing—No Attention—No Extra Room Required—No Tear and Wear—No Noise—No Oscillation in Vacuum, or Back Pressure.

UPWARDS of 150 in USE in CONTINENTAL GAS-WORKS.

IN ENGLAND SUPPLIED TO—

Chartered Gas Co., London.
London Gaslight Co., London.
South Metropolitan Gas Co., London.
Phœnix Gaslight and Coke Co., London.
Liverpool United Gaslight Co., Linacre.
Corporation Gas-Works, Bolton.
Cornholme District Gas-Works, near Todmorden.

These Gas-Exhausters are kept in stock in 16 different sizes, delivering from 500 cubic feet to 60,000 cubic feet of Gas per Hour.

E. KÖRTING'S PATENT STEAM-JET REVIVIFYING BLOWERS

For the Purifying Material are kept in Stock in three different Sizes. Upwards of 100 in use.

IN ENGLAND SUPPLIED TO—

Phœnix Gas Co., South Metropolitan Gas Co., Chartered Gas Co., London Gaslight Co., Independent Gas Co., in London.
Gas-Works, Brentford, Middlesex.

We beg to inform Gas Engineers that we are Licensees for

W. CLELAND'S PATENT STEAM GAS-SCRUBBER,

Combining small cost and thorough efficiency with absence of any mechanical means and necessity of renewing the scrubbing material.

For particulars apply to KÖRTING BROTHERS,

STEAM-JET ENGINEERS, 7, LANCASTER AVENUE, MANCHESTER.

GEBR. KÖRTING, HANNOVER, GERMANY.

SCHUTTE AND GOEHRING, 222, WALNUT STREET, PHILADELPHIA, U.S.

KÖRTING BROTHERS,

STEAM-JET GAS-EXHAUSTERS AND REVIVIFYING BLOWERS FOR OXIDE.

LONDON AGENT AND AGENT FOR SOUTH OF ENGLAND:

GERALD J. TUPP, 8, John Street, Adelphi, W.C.,

To whom all inquiries for these districts should be addressed.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,

SCOTSWOOD FIRE-BRICK WORKS, NEAR BLAYDON-ON-TYNE.

THOMAS LAMBERT & SONS

MANUFACTURE EVERY DESCRIPTION OF

GAS AND WATER FITTINGS;

ALSO,

WROUGHT-IRON TUBES & FITTINGS.

SHORT STREET, LAMBETH, LONDON.

MOBBERLEY & PERRY,

THE HURST

FIRE CLAY and BRICK WORKS,

STOURBRIDGE.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAY.

Manufacturers for Home and Export.

GAS-RETORTS, GLASS-HOUSE FURNACE, BLAST-FURNACE, & TANK BRICKS, LUMPS, TILES,

And Every Description of Best Fire-Bricks.

"SELLARS' CEMENT"

PREVENTS WASTE OF GAS FROM RETORTS;

SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;

GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;

And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.

J. C. SELLARS,

THE GAS CEMENT WORKS,

BIRKENHEAD.

B. CARPENTER,

THE ORIGINAL MANUFACTURER OF

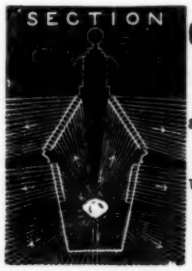
WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

WORKS:

22, HERMES STREET, PENTONVILLE ROAD, LONDON, N.



THE PATENT

CATOPTRIC LAMP

Is now in use in Moorgate Street, Cheapside, and Trafalgar Square, and has been in successful operation upon Waterloo Bridge since Oct. 7, 1871.

T. A. SKELTON, 37, Essex St., Strand, LONDON, INVENTOR AND PATENTEE.

IMPROVED

GAS-VALVES,

AT GREATLY

REDUCED

PRICES.

Inch.	s.	d
2½	24	0
3	27	0
4	36	0
5	45	0
6	54	0
7	63	0
8	80	0
9	90	0
10	100	0
12	135	0
14	180	0

TANGYE BROS. & HOLMAN,

LAURENCE POUNTNEY LANE,

LONDON.

WARNER AND COWAN'S
SELF-REGULATING GAS-METER,

PATENTED IN

GREAT BRITAIN, FRANCE, AUSTRIA, PRUSSIA, BELGIUM, AND THE UNITED STATES.

OPINION

OF

W. RICHARDS, Esq., London, Inventor of the Dry Gas-Meter.

"Your improvement in the Wet Meter is decidedly the best that has been introduced since its invention; exceedingly beautiful and simple, which renders the instrument mathematically correct, and infinitely more accurate than any means in general usage for the measurement of liquids."

OPINION

OF

WILLIAM MANN, Esq., late Superintendent of the Chartered Gas-Works, Blackfriars, London.

"I saw a model of your Wheel to day,* and certainly think it the best addition that the Wet Meter has received since its invention, to ensure correct registration until the closing of the valve."

* Sept. 8, 1874.

From "THE JOURNAL OF GAS LIGHTING," Jan. 5, 1875.

"The changes effected in the construction of the wet meter are such that it now occupies a position which it never held before—that of an unvarying measure. . . . . Both company and consumer are now equally protected, perfect accuracy of measurement is obtained, and that, too, without the least increase of mechanism, or the action of the meter in the least degree being prejudicially affected."

From "IRON," March 13, 1875.

"The construction of their meter is beautifully ingenious, and of great simplicity. All extraneous compensating arrangements are cast aside, the inventors having boldly attacked the measure itself, making it of fixed capacity in spite of a varying water-level. . . . . Thus this meter is the only one we know of with a fixed capacity. It is more stable in action, from the greater range of float, arising from the greater range of water-level, which the construction gives. Not only in a normal condition, but under varying circumstances, its registration is practically correct."

Opinion of THOMAS WHIMSTER, Esq., Engineer of Perth Gas-Works.

"When full, with 3 gills run off, and again with 7 gills extracted, the registration did not vary one-quarter per cent. I am thoroughly satisfied with your Meter, and will take the earliest opportunity of giving you an order."

Opinion of B. M. M'CRAE, Esq., Engineer to the Dundee Gas Commissioners.

"Surpasses anything that has hitherto been produced."

BRITISH ASSOCIATION OF GAS MANAGERS, Leeds, 1875. Inaugural Address of the President, JAMES PATERSON, Esq., F.G.S., of Warrington.

"There are, however, degrees of what may properly be termed excellence; and this leads me to notice one of the most beautiful applications which science has yet devised in the construction of the meter, and which has rendered it an absolutely reliable and unvarying instrument. . . . . The object aimed at, and most admirably accomplished, is to change the varying measurement of a varying water-line to an unvarying measure with a varying water-line and annulus. Thus far the meter is proved to be highly satisfactory, and should the experience of a few years practical working sustain the expectations thus formed regarding it, it is likely to be brought into very general use."

From GEORGE ANDERSON, Esq., Consulting Gas Engineer, London.

"Found correct at the water-level, and also with 30 and 60 cubic inches of water withdrawn."

Mr. H. SPORNE, Meter Inspector to the City of London,

Referring to the lights, certifies, "Lights in each firm and steady."

Opinion of Dr. WALLACE, F.R.S.E., F.C.S., Gas Examiner for the City of Glasgow.

"I have no hesitation in saying that it is the most perfect Meter that has come under my notice. . . . . Such extremely accurate performance, combined with such an extensive variation in the quantity of water, leaves nothing further to desire in the measurement of gas."

THE PATENTEES ARE PREPARED TO GRANT LICENCES For the Manufacture and Sale of the above.

(A Licence for Great Britain has been granted to Messrs. J. and J. BRADDOCK, Oldham, and Licences for Austria and Prussia to Messrs. A. FAAS & Co., of Frankfort and Vienna.)

APPLICATIONS TO BE MADE TO

THE ORIGINAL LICENSEES AND MANUFACTURERS:

W. & B. COWAN,

ESTABLISHED 1827,

KING HENRY'S WALK,
BALLS POND ROAD,
(NEAR DALSTON JUNCTION STATION,) LONDON, N.

BUCCLEUCH ST. WORKS,
EDINBURGH.

Remarks on some Points of Agreement and Difference in Meters that have been generally adopted for the Measurement of Gas:—

WET METER
(COMMON).

Variable measure, and affected by valvular (hood) action; **variation limited** to height of spout and range of float. Measures and valves (hoods) are constructed together, and form but parts of a simple wheel revolving on an axis; the variation of measurement arises from the variation of water-line.

Measures constructed of incorrodible metal.

Valves (hoods) formed by portions of the measures passing through the water in the meter.

Action of the float and valve sensitive and limited.

DRY METER
(EVERY MAKE).

Variable measure, and affected by valvular action. **Variation unlimited,** depending upon the condition of leather and valves. Measures and valves are separate and distinct parts of the Meter, and complicated by the mechanism necessary to transmit the motion of one part to the other.

Measures formed of a porous leather. Valves formed by surfaces of metal rubbing over each other. Action of Meter sensitive from rubbing surfaces of Valves. Allows gas to pass unregistered, but none of the others permit this.

WET METER
(COMPENSATING).

Dependent on a true as well as a fixed water-line. Varies more or less, and to the extent of range of float, if it is adjusted to water-line Measures and valves as in the common Meter in construction and action, but it is complicated by external arrangements, to ensure as far as possible a constant water-line, on which the accuracy of measurement is dependent.

Valves (hoods) as in common Meter. Action of float and valve depends upon their position in the Meter.

WET METER
WARNER & COWAN'S
(SELF-REGULATING DRUM)

Unvarying measure, and unaffected by valvular (hood) action.

Measurement accurate through the whole range of float.

Measuring-wheel constructed with an inner wheel, by which the action of the Meter is neither impeded nor complicated, and which ensures **accurate measurement with varying water-line.**

Measures incorrodible metal. Valves (hoods) as in common Meter.

Range of float increased, and less liable to be affected by change of pressure or consumption.

THE RANGE ALLOWED BY SALES OF GAS ACT NECESSARY IN THESE METERS. **NO RANGE NECESSARY.**

W. & B. COWAN, LONDON AND EDINBURGH. Established 1827.

THE FARNLEY IRON COMPANY, LIMITED,
FARNLEY, near LEEDS,
MANUFACTURERS OF
FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Gas-Retorts in Fire-Clay.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

Apply as above, or to the London Offices, 15, NEW BROAD STREET, E.C.

THE
PATENT "UNIVERSAL" STEAM PUMP
WAS AWARDED, AT THE
VIENNA EXHIBITION, 1873,
THE GRAND PRIZE "MEDAL OF PROGRESS."
AT LILLE—GOLD MEDAL - - - - 1874. AT MANCHESTER—SILVER MEDAL - 1874.

OPINIONS OF THE PRESS.

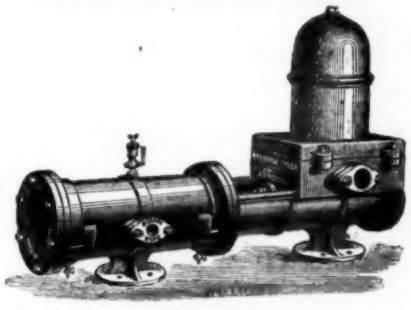
"The simplest machine of its kind."—*Engineering.*

"Remarkable for its simplicity and ease of action."—*Daily Telegraph.*

"None that we have noticed work so quietly."—*The Engineer.*

"Nothing invented in hydraulic steam power half so cheap and effectual."—*Griffith's Iron Trade Exchange.*

NO TAPPET VALVES OR GEAR.



IN USE IN SOME OF
THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,
FOR
TAR AND AMMONIACAL LIQUORS.

ONE SELECTED FROM AMONGST MANY TESTIMONIALS RECEIVED BY H. T. & CO.:—

"*Ardwick Bridge Chemical Works, Manchester, Oct.* 28, 1872.

"Sir,—The 'Universal' Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily,

"Yours truly,
(Signed) "PETER HART, *Manager.*"

SOLE MAKERS,
HAYWARD TYLER & CO.,
84 and 85, UPPER WHITECROSS STREET, LONDON, E.C.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:
DARTMOUTH AND BRIXHAM, DEVON.

OFFICES:
23, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

SOLE PROPRIETORS AND MANUFACTURERS OF
WOLSTON'S CELEBRATED
TORBAY IRON PAINTS.
(ESTABLISHED 1851.)

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Waggon Works, and the Paint Trade generally. They are the BEST PROTECTORS of IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to ironwork. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only before use to be thinned down in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

PRICES and TESTIMONIALS on APPLICATION.
(See Notice on another page.)

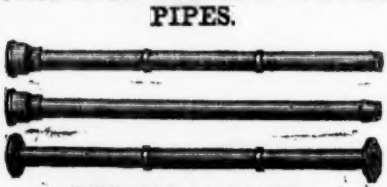
ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of
CLAY RETORTS, FIRE-BRICKS, AND EVERY DESCRIPTION OF FIRE-CLAY GOODS

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
18 & 20, ALSTON STREET, GLASGOW.

CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B. ON CLYDE.
Prices on application.

TO GAS COMPANIES AND THE TRADE.
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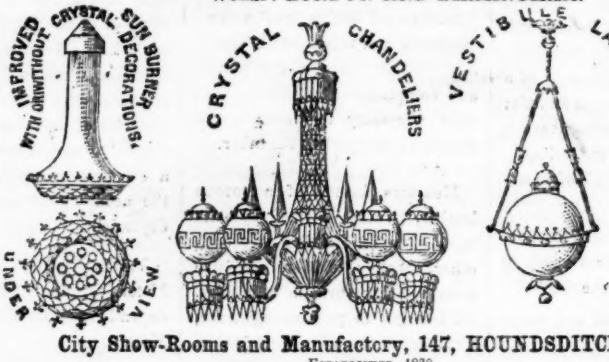

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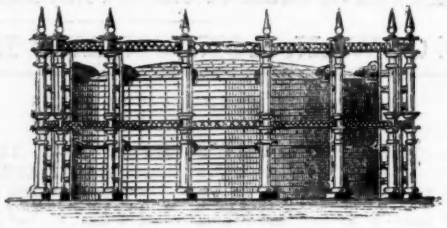

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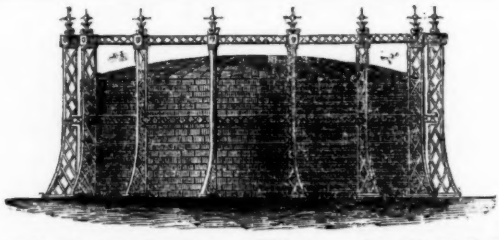

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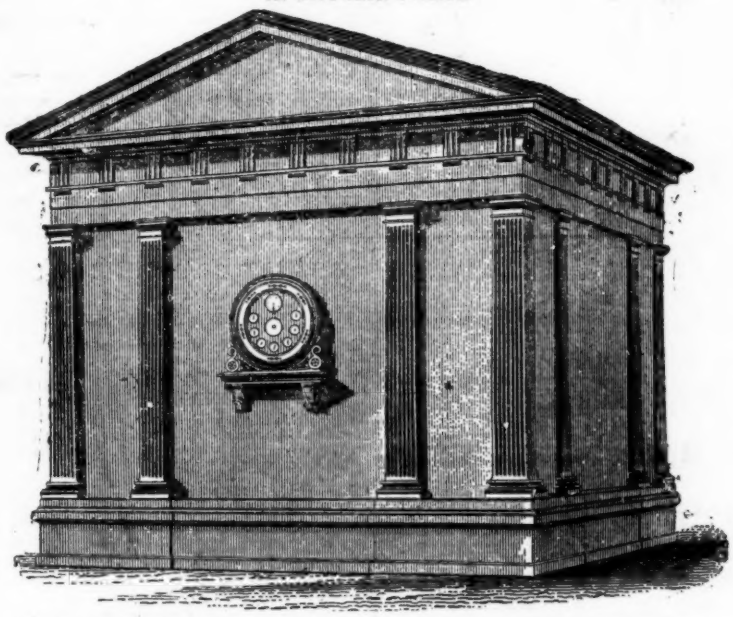

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References can be given to managers of above a hundred Gas-Works whom he supplies.

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Cubic Feet.	Illuminating Power.	Coke (sup. qual.).
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Beg leave to call the attention of Gas Companies to the superior quality of their

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This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

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Which yields 13,265 cubic feet of 35·86 standard candle gas; and 973 pounds of good coke, containing 18·89 per cent. of ash.

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Which yields 10,538 cubic feet of 33·2 standard candle gas; and 1216 pounds of coke, containing 11·86 per cent. of ash.

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Which yields 10,575 cubic feet of 27·38 standard candle gas; and 1240 pounds of coke, containing 11·56 per cent. of ash; and

DRUMPELLER COAL,

Which yields 10,018 cubic feet of 21·97 standard candle gas, and 1260 pounds of very best splint coke. (This is also a first-class steam coal.)

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STRONGLY RECOMMEND A TRIAL OF THEIR

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Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

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THE DERBYSHIRE
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Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10,775
Weight of coke in lbs. per ton of coal	1,465

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This Company request attention to the very superior quality of their Cannel Coals.

1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.	Sample worked at Lochore.
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure . .	13,095 cubic feet.	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91	34·83
Value of 1 cubic foot of gas in grains of sperm	780	836
Equivalent of a ton of coal in pounds of sperm candles	1,459	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes.	71 minutes.
Gravity of the gas (air = 1000)	596	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.	Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet.	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62	33·09
Value of 1 cubic foot of gas in grains of sperm	878	794
Equivalent of a ton of coal in pounds of sperm candles	1,145	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes.	67 minutes.
Gravity of the gas (air = 1000)	677	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

Applications for full Copies of Analyses and Prices may be made to the Company, at
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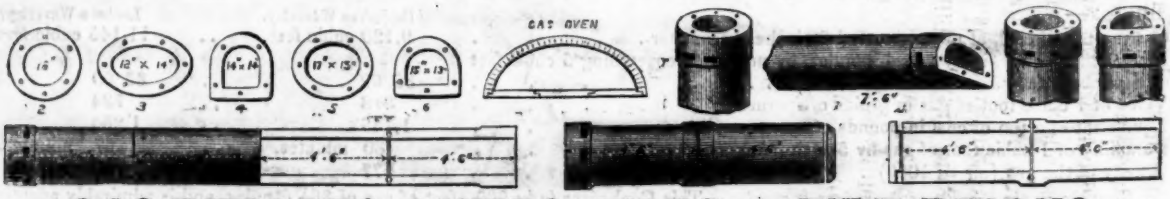

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